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ART. I.—*On the Poisons which interest the Surgeon.*[1] By W. H. VAN BUREN, M. D., Professor of Surgery, etc., Bellevue Hospital Medical College, etc., etc.

THE subject of poisons, gentlemen (or of surgical poisons as I must designate it, in order not to go beyond my province), has come to be one of great importance to us of late. My colleague in the chair of Materia Medica will demonstrate to you that all our most potent medicines are capable of acting as poisons; and the Professor of Chemistry will unfold to you the science of toxicology, but neither will bring before you the poisonous influences which especially interest us as surgeons, and which we are called upon to understand and combat with our skill. The study of these belongs to surgical pathology. The three great divisions into which surgical affections naturally arrange themselves, namely, wounds and injuries, tumors and morbid growths, and the effects of poisons, include the whole category of so-called surgical diseases; and the last-named division is by no means the least, either in extent or importance. You perceive that I embrace within the scope of

[1] This paper comprises the substance of lectures in the preliminary course, 1875–'76, at the Bellevue Hospital Medical College.

the term "poisons" a much wider range than that included in the chapter on "poisoned wounds" in the ordinary text-books of surgery. Here are considered only "dissection-wounds," the stings of insects, and the bites of serpents and of rabid animals, and, finally, glanders; but in addition to these there is a whole phalanx of virulent agents against which the surgeon is called upon to struggle in his daily efforts to control the maladies committed to his charge. The progress of exact science is every year bringing these poisonous influences more and more within the range of our perceptions, and more clearly defining them; so that, with increasing knowledge of their nature and the manner in which they cause disease and death, we are also in a better position to learn how to oppose them and destroy their effects. If I can succeed in inspiring you with a broader interest in the subject than you are likely to get from the chapter in your text-books on poisoned wounds, you will find that I have opened up to you a direct avenue to an important department of surgical pathology.

During the last century there was no distinction recognized, by the best physicians, between the diseases known since as measles and scarlet fever, nor between the poisons causing them; these we now distinguish with absolute certainty—although we have not, as yet, discovered their special poisons, nor the antidotes to them. So also as regards syphilis, gonorrhœa, and the contagious venereal ulcer—three distinct diseases which a hundred years ago were regarded as one and the same by the highest surgical authorities. At present we recognize that each of these diseases is caused by a distinct and different poison—as different, in fact, as the poison of measles is different from that of scarlet fever, or the poison of small-pox from that of whooping-cough. In regard to the continued fevers, also, advancing knowledge has made the differences clear between typhus and typhoid, and has established the distinction between the poisons to which they are due; so clearly, indeed, has the nature of these poisons been made out, that fevers of this type are now formally recognized and spoken of as "preventable diseases." Pyæmia has been distinguished from phlebitis, and established as a blood-disease. In like manner there are, probably, diseases now grouped

together and treated of in surgical works as identical (erysipelas, pyæmia, and diffuse cellular inflammation, for example), which not many years hence will be recognized as entirely distinct in their origin and nature. It is worth while to remark that advance in knowledge consists, in a large degree, in learning to discriminate, or make distinctions, where before no distinctions had been recognized.

Thus, as we learn more of the nature of these poisonous influences we are better able to discriminate between them, and to distinguish their respective effects upon the organism; and while their number increases, and they obviously multiply upon our hands, they inspire less fear than when grouped in a solid phalanx which our ignorance could not penetrate; we recognize that they are not really greater in number, but only seen somewhat more distinctly in their individual proportions, and we find ourselves in a position to attack them in detail, and with better prospect of successfully conquering them. Moreover, there are certain vague theoretical doctrines, embodied in the terms "zymotic" and "septic," which are used at the present time without any very distinct meaning attached to them, and used a good deal, it seems to me, for the purpose of covering ignorance: these terms we shall endeavor to define according to their true meaning, and by exposing just what is known of the diseases to which they are applied, even if we at the same time expose the limits of our knowledge, we shall be in better position to advance them.

There are certain poisons which we may call "medical," inasmuch as they produce diseases which are assigned conventionally to the province of the pure physician; these are the poisons which give rise to typhus and typhoid fevers, smallpox, measles, scarlatina, diphtheria, chicken-pox, whooping-cough, mumps, etc. Others, again, which cause diseases that are regarded as belonging to the surgeon, e. g., insect-poison, serpent-poison, poison from a recently-dead body, the poison of glanders, of hydrophobia, of septicæmia perhaps, of pyæmia, of erysipelas, of syphilis, of chancroid, of gonorrhœa, of malignant pustule, etc. There is a third class of poisons which complicate medical and surgical diseases equally, namely, those which are volatile and mingled with the air we breathe,

the noxious effects of which are brought to bear upon the organism mainly by absorption through the lungs: I refer to malaria, carbonic-oxide gas, sulphuretted hydrogen, etc.

Now, these constitute already a serious array of poisonous influences; and, moreover, they all differ essentially in their nature, i. e., no one of them can produce upon the organism the effects of another.

Confining ourselves to the surgical poisons, and referring to what we know of other poisons merely for purposes of illustration, let us examine these surgical poisons more closely, and ascertain if it be possible to designate or classify them more accurately than as zymotic or septic poisons, by studying the modes in which they act, or upon any other basis.

As just stated, sulphuretted hydrogen may be inhaled by the lungs; and carried thence by the blood (which absorbs it) into contact with the elements of nerve-tissue, it produces, as we know, nervous depression and nausea, and possibly death. The effect of this poison, coincident with a certain moral impression, explains the sensation often experienced on first visiting the dissecting-rooms.

The anæsthetic agents, chloroform and ether—which in a certain sense come within the denomination of poisons, for they are competent to cause death—also act by being introduced into the blood through the respiratory passages, and thus brought to bear upon the nervous centres. But, when not administered in excessive doses, or too persistently, the blood is able to rid itself rapidly of all of the noxious agents of this class, and consequently their poisonous effects soon pass away.

Notice that, as it is by the lungs that these volatile poisons are unnaturally and forcibly introduced into the blood, so it is by the lungs also that they are naturally eliminated from the blood. This power of *absorption* by the lungs is demonstrated daily in the process of administering ether and chloroform. You will probably see Bernard's famous experiment illustrating the capacity of the lungs in also *eliminating* poisons repeated by my friend the Professor of Physiology. Bernard, after having killed a bird under a bell-glass, instantaneously, by introducing a very small quantity of sulphuretted

hydrogen into the air the bird was breathing ($\frac{1}{800}$), proceeded in the next place to inject a quantity of the gas directly into the vein of a dog. He had previously placed before the dog's nose a sheet of paper soaked in lead-water, and in less than five seconds after the injection of the gas into the vein the paper began to show a black stain of sulphuret of lead, which went on increasing until the whole of the poison was eliminated, and this was soon accomplished.[1] Here the bird died because it was immersed in and obliged to breathe over and over again the poisoned air; it was deprived of the eliminatory power of the lungs; it was in very much the same position as a surgical patient who has undergone an operation and is afterward confined in the bad air of a tenement-house, or in the worse atmosphere of a hospital-ward, where good ventilation is not provided. The dog, on the other hand, threw off the poison, and recovered promptly, because his lungs were free, and he had fresh air.

I desire to impress upon you the fact that sulphuretted-hydrogen gas, which is by far the most common cause of bad smells, is a poison capable of seriously depressing the powers of life, and consequently of retarding recovery from a surgical injury; and that it can always be got rid of through the lungs, provided that the patient is furnished with an ample supply of pure fresh air.

Again, a poison may be introduced into the circulation by simple *inoculation*, in minute quantity, as by the point of a lancet. One of the uses of the epidermis, which covers our bodies like a flexible varnish, is to protect the thin-walled blood and lymph vessels which lie beneath it from absorbing noxious substances from without, by the process we call *osmosis*—which, after all, is only a sort of inhalation and exhalation, similar to respiration—but of liquids instead of gases. Hence, when the epidermis is abraded, or removed, there is no impediment to absorption; if we scratch it away at any point and apply a poisonous substance, that poison, if soluble, will be at once carried into the blood: this, we do, in fact, in the little operation of vaccination. A poison thus introduced

[1] "Leçons sur les effets des substances toxiques," etc., Paris, 1857, p. 58.

into the blood will straightway produce its peculiar effects, slowly, or rapidly, according to its nature; if active and deadly like that of the East-Indian cobra or hooded snake, it will cause death as soon as the circulating torrent shall have brought the poison into contact with the nerve-cells of the brain. Small animals (in the experiments of Prof. Fayrer[1]), such as fowls, when bitten by an active snake of this species, died almost instantaneously; and dogs have died, in several instances, in from thirty to forty-five seconds. When the limb bitten by the snake had been previously encircled by a tight ligature, the action of the poison was delayed; but as soon as the ligature was removed the animal succumbed: thus proving the conveyance of the poison by the blood. The famous *curare* or *woorara* affords another example of this mode of action. This poison may be taken into the stomach with impunity in sensible quantities; the Indians kill game by means of arrows poisoned with *curare*, and eat freely, without harm, the birds and animals thus destroyed; but if the minutest portion of the poison is brought in contact with the circulating blood, death follows inevitably.[2] This apparent paradox is explained by the fact that absorption from the digestive surfaces when sound takes place very slowly in comparison with absorption by the capillary blood-vessels and lymphatics, and that coincident elimination of hurtful matters from the blood is going on so constantly and rapidly by kidneys, lungs, skin, and bowels, that unless thrown directly into the blood by inoculation, enough of the poison cannot be brought at any one moment in contact with the nerve-cells to produce its full poisonous effects. We have daily evidence that the injection of a few drops of morphine under the skin produces a more prompt and thorough effect than the same amount if taken into the stomach.

Physiologists, in studying the action of this singular poison, curare, found that its terribly fatal effects are only temporary; and that by keeping up artificial respiration for a time, until the influence of the poison has exhausted itself, the animal's life can be saved, and no injurious after-effects follow. In

[1] "On the Action of the Cobra-Poison," *Edinburgh Medical Journal*, vol. xiv., part i., p. 522, July to December, 1858.

[2] Bernard, *op. cit.*

fact, it is in constant use in the laboratory, for keeping frogs quiet, in many experiments, while studying the phenomena of circulation. Again, you are all familiar, probably, with the mortal effects which may be produced by inhaling the fumes of burning charcoal, a mode of suicidal poisoning often made use of by unhappy people of both sexes in France—one of the few French fashions which our national good sense has prevented us from following. When this poison is inhaled, its effect is felt in the first instance by the blood itself, and not by the nervous centres, as in the examples already cited. The *carbonic oxide*, which is the poisonous agent, acts directly upon the red globules of the blood, forming an instantaneous chemical compound with the hæmaglobulin which is their main constituent. Now, the use of this hæmaglobulin is to absorb oxygen from the air in the lungs and carry it to the tissues, and there part with it, a function necessary to the continuance of life. But if a suicidal Frenchman is discovered in the act before his red globules have been too extensively killed by the poison, and is carried into the fresh air, he will at once revive, and, after a very severe headache, he will pretty rapidly recover. We all know how promptly the lassitude, or languor, caused by hot-air furnaces is relieved by going out into the fresh air, and in this case we are dealing with the same carbonic oxide.

Here is another instance of a poison capable of causing death in a limited time, the effects of which pass off rapidly as soon as the poisonous influence is removed.

Thus, there are poisons, even of the most deadly nature, which when introduced into the blood produce their effects by contact with the nerve-centres, or by spoiling the elements of the blood itself; and yet these effects are but temporary and evanescent, and, when life is not compromised, they may pass off so promptly and entirely as to leave no appreciable consequences behind them.

On the other hand, there are also poisons which, similarly introduced into the organism, produce their effects *after so-called periods of incubation, and then pass away*, leaving traces which may remain during life—as in the eruptive fevers; some again which act slowly, irregularly, with intermissions—their

effects being always brought to bear upon the nerve-centres through the blood—as in malarial and pyæmic poisoning; one which has been, so far, always promptly mortal—that of hydrophobia; another, that of syphilis, which manifests a tendency to linger indefinitely and to affect all the tissues in turn; and others, finally, of which the action is entirely local —as the poison of most insects, of "poison-vines," of gonorrhœa, of chancroid.

There are many features about poisons which, in the present state of our knowledge, are mysterious, unaccountable, and seemingly capricious. The deadly poison of the Indian cobra —the effects of which are promptly mortal to animals of every sort—is innocuous when applied to another cobra; these reptiles bite each other cruelly, but no ill effects follow.[1] On the other hand, Dr. Weir Mitchell's experiments upon the rattlesnake would seem to demonstrate conclusively that the American serpents can, and do, poison themselves, and each other.[2] According to Livingstone, the famous tsetse-fly, which renders certain regions in Africa almost uninhabitable, is harmless to man, to the goat, and to all wild animals, but fatal to domestic animals. The bite of a small number of these insects so poisons the blood of cattle and horses that they die, without exception, in a rapid and steady decline, and their flesh is found thoroughly altered both in appearance and consistence.[3] Thus, in man, examples are constantly occurring of immunity from the action of poisons, in explanation of which we can only say that it depends upon a peculiar condition of system which is unknown to us. According to the experiments of Bernard (*op. cit.*), prussic-acid when introduced into the blood arrests the action of the heart, without affecting the nerves; strychnia causes death by *paralyzing* the nerves of sensation; curare kills by paralyzing the nerves of motion, leaving those of sensation intact. Opium notoriously blunts

[1] Fayrer, *op. cit.*

[2] "Researches on the Venom of the Rattlesnake," "Smithsonian Contributions to Knowledge," 1860, p. 63.

[3] "Missionary Travels and Researches in South Africa," by David Livingstone, LL. D., D. C. L., p. 81, *et seq.* London, 1857. From Figuier's Insect World." New York: D. Appleton & Co., pp. 74, 286.

the consciousness of pain; the poison of the mad dog, on the contrary, intensifies it to the last degree, so that the contact of a breath of air causes agony. All these and many more curious phenomena might be cited as ultimate facts, which we recognize, but cannot, as yet, account for; we speak of them as inherent, essential, or specific qualities of such or such poisonous drugs. Obviously these facts are too few and too imperfectly understood to serve as a basis for permanent classification.

You have a right, before I proceed further with these general considerations, to ask for a definition of the term "poison," and this is the best that I can give you: It is the generic name of all those substances which, when introduced into the animal economy by absorption either through the skin, lungs, or digestive surfaces, possess the power of attaching themselves to the constituents of its tissues or humors, and of disturbing the functions of the economy, or causing death.[1]

Poisons may be mineral or organic in their origin; crystallizable or volatile in their form.

They all act, ultimately, by uniting themselves, molecule by molecule, to the immediate principles of the living tissues, which they modify or decompose.

Certain poisons manifest affinities for particular parts: as arsenic for the stomach, strychnia for the spinal cord, carbonic oxide for the red blood-globules, chloroform for the nerve-cells of the brain, mercury for the mouth.

I have said that the term poison is generic: now, there is a species of poison known as *venom*, as of insects and serpents; another always spoken of as a *virus*—as of small-pox and syphilis; and a third, applied to typhus and ague poison, etc., called *miasm*. All surgical poisons come under one or another of these specific designations; and, as the terms are in constant use, it is well for you to attach a definite meaning to them.

The term "venom" is applied to special humors secreted by certain glands of animals, or indeed of vegetables—as to the poison of the mosquito, of the rattlesnake, or of the nettle. This species of poison owes its power to some organic

[1] "Robin et Littré," article "Poison," edition 1873, Paris.

compound elaborated by the vital process of secretion; it retains its venomous properties after desiccation, and after the death of the organism in which it has been elaborated—as in the instance of the Spanish-flies, the cantharides; in fact the venomous quality persists until the substance itself undergoes decomposition. Echidnine, the active poisonous principle of the venom of the viper, which has been isolated by chemical process, is a good specimen of what pathologists call an "animal substance."[1] It is of a gummy consistence and aspect, contains nitrogen, is soluble in cold water, neutral in its reaction, not coagulable at 212° Fahr.; alcohol precipitates it, but water redissolves it—which is its distinctive quality; it blackens the blood, and prevents the coagulation of its fibrin.

Mitchell also isolated the active toxic element of the venom of the rattlesnake, which he describes as an albuminoid body of neutral reaction; of a pale-yellowish tint when dried, and resembling echidnine in all essential particulars. He distinguishes this substance by the name of *crotaline* (p. 37). Mitchell says: "It is difficult to conceive of the singular energy of the venom of the rattlesnake without carefully-conducted experimental research, or of the tenacity with which its powers are preserved in the presence of violent chemical reagents and extremes of heat and cold. The dried venom retained its potency after two years of climatic changes; nor was it in any degree impaired by strong sulphuric and muriatic acid, ammonia, chlorine-water, soda, or potassa. Iodine and tannic acid seemed to prevent its local but not its constitutional symptoms. Freezing did not alter the powers of the venom, and the most prolonged boiling was inadequate to destroy its deadly qualities" (p. 44, *et seq.*).

A "virus" is the result of a peculiar chemico-vital change which takes place in the solid or liquid organic substances naturally existing in every living body, and elaborated by its vital machinery. A virus is intangible; it cannot be isolated by chemical process; and can be studied only in its effects upon living bodies. Virulent matters, thus begotten, act by *transmitting to other living beings a tendency to take on the*

[1] Analyzed by Prince Charles Lucien Bonaparte. Mitchell, *op. cit*, p. 35.

same changes which they themselves are undergoing, or have undergone.

I will remark here, that these changes which a virus has the peculiar power to set in motion in the living body are not the same as those caused by the presence of a ferment, although they resemble the process of fermentation so nearly that it has grown into a custom to speak of them as "zymotic." This term, derived from the Greek (ζύμωσις, fermentation), was originally applied to contagious and epidemic diseases because the poisons causing these diseases seemed to work like the yeast-plant in beer, in regard to the quality and power they manifested of reproducing and multiplying themselves. The term was intended to convey the idea of *resemblance to the process of fermentation*, and not of *actual fermentation*. Since Pasteur advanced his theory that the process of putrefaction is also in reality a process of fermentation, brought about by the microscopic fungi known as bacteria which, he says, play the same part in causing putrefaction that the spores of the yeast-plant perform in ordinary alcoholic fermentation, the fashion has sprung up of attributing to bacteria the properties I have enumerated as belonging to virulent substances. That this is an error, which is entirely opposed to the conclusions of the latest and best authorities, I shall shortly demonstrate to you. Meanwhile I must ask you not to ascribe virulent properties to bacteria, which are nothing more than microscopic fungi, and are possibly as perfectly innocent in their nature as maggots in a wound.

The changes which follow the introduction of a virus into a living body are sometimes immediate, and at others delayed, apparently, for weeks—sometimes for months; they vary according to the nature of the lesion, of the virus itself, or of the tissue or humor affected. In the action of the vaccine virus, of that of the contagious venereal ulcer or chancroid, or of the virus of syphilis itself, are seen examples of this variety of poison.

Virulent substances, as in the case of vaccine matter, can be desiccated and preserved, under favorable circumstances, indefinitely. They retain their power until overtaken by decomposition. Please notice this fact, for it explains why there

is more danger from a dissecting wound received in opening a recently-dead body, than in the prolonged manipulation of a subject advanced in putrefaction. A virus generated by the changes which immediately succeed death must be destroyed by the decomposition that necessarily follows—in the language of Robin, "putridity destroys virulence"—because the virus, in being decomposed, ceases to be a virus.[1] We see examples of this phenomenon constantly in our clinical experience: an advancing chancroidal ulcer, when overtaken by phagedæna or sloughing, has its virus destroyed in the common death of the virus and of tissue with which it is in local contact, so that when the slough separates a healthy sore is left behind. We actually imitate and adopt this as a mode of cure, when we apply a powerful caustic to the virulent ulcer; for the caustic decomposes the virus at the same time that it kills the tissues which are undergoing change by the virulent contact.

The term "*miasm*" is applied to virulent organic substances, either volatile, or given off by volatile liquids during evaporation, which come from animal or vegetable tissues in process of decomposition, or from the sweat, pulmonary exhalations, or fecal evacuations of living beings, healthy or diseased. A miasm is evidently almost identical with a virus—the idea of volatility being superadded; therefore, with this exception, the terms are synonymous. Miasms may be conveyed by the air and by the clothing, and hence become the means of transmitting diseases known as contagious or epidemic. We speak of the poisons of typhus and typhoid fevers as miasms, but the most common application of the term in our country is to that form of poisonous emanation which begets the large class of diseases known as "malarial." Miasmatic exhalations from the soil poison the air, and thus beget malaria. The term miasm is properly applied to the poison of

[1] "Comptes rendus de la Soc. de Biologie," 1868. Weir Mitchell states, however, that the venom of the rattlesnake killed promptly when it was smelling horribly and full of "animalculæ," vibriones, and "rotiferæ." He says he is unable to state from his own experience what extent of putrefactive change might be needed to destroy its poisonous quality. (*Op. cit.*, pp. 32, 51.) I would remark that the active principle of the rattlesnake-poison may be an alkaloid (like morphia), and not liable to putrefaction.

erysipelas; less so, perhaps, to that of pyæmia; certainly not to that of a dissecting-wound.

In attempting to get at enough general facts to justify a classification of surgical poisons, we have at least established definitions with some pretensions to accuracy of the terms usually applied to them; but it is plain that surgical poisons cannot be classed according to their mode of action, because all of them that place life in peril act upon the living body very much in the same way, namely, by getting into the blood and perverting the functions of this vital fluid. The singular and constant affinities manifested by some poisons for special organs and tissues, already noticed, are always to be kept in mind in seeking for antidotes and remedies; but these qualities do not avail for classification. We can only say of them that these poisons act upon the several parts toward which their affinities impel them, by means of the peculiar contaminations which each of them impresses upon the blood.

Some of the poisons that interest us as surgeons are inorganic in their origin, although a large majority have their source in organized matter: of the latter some are animal and others vegetable in their nature; but these differences in source are equally unsafe as a basis for classification, for, as the light of science grows stronger, the dividing lines between the great kingdoms of Nature are fading out. Moreover, there is no marked difference of action in the poisonous substances that come from these different sources, whereby we can establish distinctions between them as mineral, animal, or vegetable: arsenic, chloroform, the compounds of cyanogen—the poison of the rattlesnake, the cobra, or of the rabid dog—marsh-miasm, strychnia, curare—present in each group almost equally prompt and deadly poisons in the varying forms of solid, liquid, or vaporous gas; but they all cause death in a similar way—by stopping the action of vital organs when brought in contact with them by means of the blood.

We have learned enough, then, of the general nature of poisons to justify this conclusion, that the present state of our knowledge does not permit classification on the basis of difference of action, or of difference of source, and that all (surgical poisons, at least) would seem to act through the blood. They

act either upon the elements of the blood—as in the reaction between carbonic oxide and the red globules, or they mix with it mechanically, or they disturb the chemical stability of the albuminous compounds of its plasma—as when the cobra-poison prevents coagulation of its fibrin, or they set agoing the mysterious changes by contact, or presence, through the peculiar power which we have ascribed to virulent substances. The resultant action of the blood, thus altered, upon the elementary cells and tissues of vital organs comprises the whole pathology of surgical poisons. In order to estimate at its true value this idea, which forms the basis of surgical pathology—not only of poisons but of most general diseases—I must ask you always to think of the blood, in accordance with the teachings of modern physiology, as a sort of internal atmosphere, in which all the tissues and organs of the body are suspended, in which all the organs and tissues of the body are continually bathed, and from which they derive all their sustenance. If you can succeed in doing this, it will not be difficult for you to conceive why changes in the blood explain derangements of function, alterations of tissue, or even arrest of the phenomena of life. You will be prepared to understand why the term "blood-poisoning" is so constantly on the lips of the clinical teacher in the wards of the hospital, and of the pathologist in the dead-house.[1]

Before proceeding to study in detail the surgical affections which have their origin in poisons, or are complicated by them, we must if possible get a clear idea of the meaning attached to the word "septic" and to the phrases "septic influences," "septic poisoning" and the compound word "septicæmia." These terms are in constant use by the latest and best writers, and the ideas intended to be conveyed by them are sometimes a trifle vague, and not easily explained. An attempt to define them will bring us face to face with the most difficult questions which at present occupy the attention of pathologists—

[1] After all, "blood-poisoning" is only a term which has been adopted with a certain signification, and we do not know with absolute certainty that it is the *blood* that is poisoned. It is quite possible that the elements of the tissues, the cells, are poisoned, are unfit to do their work, and the condition of the blood may be only secondary.

questions upon which the best minds and the best observers differ fundamentally. I will endeavor to state to you the facts succinctly, and as impartially as I can.

The word "septic" means "that which pertains to putrefaction." The idea of a "septic influence" is of a something that acts upon the tissues and humors of our living bodies in such a manner as to dispose them to take on putrefaction. Naturally it must kill them first, and then, the vital quality that resists chemical decomposition being withdrawn, it must dispose them to fall into putrefaction more promptly and readily than is usual after death from other causes. A substance that will produce these effects is properly called a "septic poison." We have an example of a septic poison in the venom of the rattlesnake. In one of Dr. Weir Mitchell's experiments he exposed a healthy active frog to be bitten by one of these reptiles. In two hours, after the usual symptoms of rattlesnake-poisoning, it was dead. "In twenty-four hours the muscular parts about the bite were almost diffluent, while the rest of the frog had no odor, or any other sign of putrefaction."[1] He says "the final influence of the venom upon the muscular structure was extremely curious." In every instance it became softened in proportion to the length of time the venom remained in contact with it, so that, after even a few hours, in warm-blooded animals, and rather a longer time in the frog, "the wounded muscle became almost diffluent, and assumed a dark color and somewhat jelly-like appearance. The structure remained entire until it was pressed upon or stretched, when it lost all regularity, and offered the appearance, under the microscope, of a minutely granular mass dotted with larger granules." In another experiment some blood was drawn from a healthy dog, who was then exposed to be bitten by a rattlesnake. In about thirty-five minutes the dog was dead. At the end of twenty-four hours the blood drawn before the dog was bitten was found as yet unaltered, and it had no unpleasant odor; but the blood in the dog's heart "was already unpleasant in smell, and that from the wound was quite putrid."[2] You have here an illustration of the effects of a septic poison from a native reptile observed by an American

[1] *Op. cit.*, p. 56. [2] Ibid., p. 92.

physiologist, than whom there is no better authority, and these cases are in accordance with the general results of his very valuable researches into the effects of this venom. Mitchell concludes that it is "clear that in *slow venom-poisoning* the *blood-plasma became profoundly altered;*" in cases of *more rapid death* the direct effect of the poison *upon the nervous centres* was the efficient cause.

As every fact concerning this curious poison, from so reliable an observer, possesses great value, I will ask your attention to the following statement:[1] "The clear poison presented no points of interest when viewed microscopically . . . . Like most albuminoid matters the venom entered into decomposition when long kept in the moist state, but although it then developed vibriones, and even low confervoid growths, and smelt most horribly, it was still poisonous. How long it would retain its virulence under these circumstances, and what extent of putrefactive change might be needed to destroy this quality, I cannot state from my own experience." Again, describing a specimen of diluted venom which had undergone decomposition and smelled badly, he says: "The production of this animalized and indescribable stench was accompanied by the appearance of *vibriones*, and, a few days later, of *rotifera* and other minute forms of animal life."[2]

Observe, if you please, that this deadly venom, when fresh, contained no microscopic elements; but when decomposition began, the low forms of life made their appearance.

I call your attention to this fact especially, because it has been of late assumed, even by prominent scientists, that these very same low forms of life, now usually spoken of under the name of bacteria, constitute *the essential elements of putridity*, and *the active principle in most, if not all, poisons of animal origin.* For the adherents of this doctrine, putrefaction is a process of fermentation precisely analogous to that of beer; a species of bacterium—the *B. termo*—playing the part, in the organized tissue and humors, of the yeast-plant of the beer—

[1] *Op. cit.*, p. 32.

[2] *Op. cit.*, p. 53. When Mitchell wrote, in 1859, vibriones were regarded as animals; now they are classed with other microscopic fungi or mushrooms.

the *Torula cerevisiæ*. Pasteur, who discovered the nature of the silk-worm disease which was impoverishing France, and applied a successful remedy to it, is the originator and most able advocate of this theory of putrefactive fermentation, which, on the other hand, is strongly opposed by the school of Liebig, in Germany, and not admitted by Robin and his followers in France.

In the most recent and best treatise on the natural history of plants, by Cohn,[1] of Breslau, bacteria are described as a genus of microscopic vegetable growths nearly allied to the fungi or mushrooms, and still more closely to the mould, rust, and smut family, but different from either. Cohn divides one of his tribes of bacteria, the "micrococci," into three groups, according to their supposed power to produce pigment fermentation, or disease; and again subdivides the disease-producing group, according to the particular disease in which it is found, into the *micrococcus vaccinæ*, *m. diphtheriticus*, *m. septicus*, *etc.*

This would be certainly a very clear and accurate definition of the word "septic," in all its applications, if the facts upon which the theory is built will support it; it would simply imply the presence of the *micrococcus septicus*, or any one of the sub-varieties of this microscopic organism, in any form of disease to which the term "septic" might be applied, and there the duty of the pathologist would end—the wonderful reproductive power of the micrococcus, as it successively invaded the tissues, would account for all further changes. Moreover, the prevention and therapeutics of these deadly diseases, most of which are epidemic and contagious, would be equally simplified; they would be compassed by learning enough of the conditions of life and of the habits of bacteria to prevent their presence or their proliferation in any given case of "septic" disease, and straightway the disease would be within our control.

This "germ-theory of disease," as it is called, has proved very seductive, and it has widely influenced the medical mind. It explains so readily the phenomena of infection and contagion, it is so easily grasped by the mind, and there are so

[1] "Beiträge zur Biologie der Pflanzen," vol. ii., p. 136.

many analogies to be cited in its support, that in the absence of clinical experience, and the tests of daily practice and actual contact with disease, the fascinations of the theory have gained for it many advocates, even in distinguished quarters. The eloquent Huxley, moved by Cohn's description of the *empusa muscæ*, a microscopic fungus which invades and destroys whole regiments of the domestic fly in autumn, expresses but little doubt that the nature and causes of scarlet fever will one day be as well understood as those of the silk-worm disease have become through the efforts of Pasteur, "and then," he adds, "the long-suffered massacre of our innocents will come to an end." [1] My eminent contemporary Prof. John C. Dalton, in view of the general interest which this subject commands, has recently made a lucid exposition of it before the New York Academy of Medicine, setting forth its claims to investigation, and the beneficent prospects it suggests. To this, and to an exhaustive paper on "Bacteria and their Influence upon the Origin and Development of Septic Complications of Wounds," undertaken at my suggestion, last year, by my friend Dr. L. A. Stimson, I must refer those of you who desire to inform yourselves thoroughly on this interesting subject.

The time at my disposal will permit me only to give you conclusions; and these conclusions, as I have already foreshadowed, are adverse to the theory that putrid poisoning is due to bacteria or living organisms. These minute organisms find their most favorable conditions of life wherever decomposition is imminent, and, inasmuch as their spores are almost omnipresent—in the air we breathe, in the water and food on which we live, and in the secretions of our own bodies—they are rarely absent in a wound or injury where tissue is dying or dead. Here they find the conditions which suit them, and here they forthwith proliferate; but they are only epiphenomena, and not the cause of the changes that follow—nor yet of the poison or virus sometimes (not always) generated in dying or dead parts. This is the conclusion to which clinical observation leads the practical surgeon; this is the conclusion reached by the foremost among the surgical pathologists of Europe,

[1] "Address before the British Association for the Advancement of Science," September, 1870.

Billroth, of Vienna, who published last year the results of a long and careful investigation of this subject.[1]

There is, then, a "septic poison," of which serpent-venom is a fair type, which is the undoubted cause of the symptoms ascribed to putrid poisoning, over and above the depressing effects of sulphuretted hydrogen—and this septic poison is not bacteria. What, then, is it? As far as we know, septic poison is an albuminoid substance (in this respect like the serpent-poison), which is formed, or forms itself, during the tumultuous disturbance of the vital processes, in a part under the influence of the inflammatory or locally fatal changes which result from injury. It is an albuminous substance newly begotten of materials derived from the albuminous blood-plasma, developing virulent properties as a consequence of chemico-vital changes in its constituent elements; in short it is a virus.[2]

This septic virus may be soluble, and therefore absorbable into the blood by capillaries or lymphatics; and, as a virus, it is of course capable of communicating to and inciting in the living humors or tissues with which it comes in contact, the changes it has itself undergone. If this virus should cause rapid death, the tissues and humors of the victim will be found, like those altered by the snake-poison, ready to fall into putrefaction, and probably, therefore, full of bacteria; but it is the virus which has caused the fatal result, and not the bacteria. The blood of this victim inoculated into another animal might give rise to symptoms of putrid poisoning in that animal by conveyance of the virus.[3] I conclude that it was a virus of

[1] "Ueber Coccobacteria Septica."

[2] The development of a virulent poison in dead and dying animal tissues is hardly more remarkable than the fact of the secretion of a similiar substance from the blood of a snake, by the poison-gland of the reptile. Mitchell found the substance of the poison-gland of the rattlesnake, when well washed of its secretion, entirely free from any venomous quality; he expressed its liquid juices and tested them by inoculation on sensitive birds, without result. And yet the epithelium lining the follicles and ducts of this gland possesses the curious power of secreting from the blood, by recombination of its albuminous constituents, the substance which constitutes the deadly venom of the rattlesnake.

[3] In a paper submitted to the French Academy in 1873, M. Onimus reported the following experiment—made under the direction of Prof. Robin:

this nature that killed the rabbits in the experiments of Davaine, which excited so much interest and discussion some two or three years ago in the French Academy. In truth, the poisonous effects of putrid matter have been known for a long time: in 1815 Orfila killed dogs by inoculation of putrid blood, bile, and fragments of putrid tissue; in 1827, Hamont (quoted by Coze and Feltz of Strasburg) killed a horse by means of injections of putrid pus taken from a gangrenous abscess, and a second horse with blood taken from the first—the first dying on the fourth and the second on the fifth day;[1] and, in 1835, Piorry first described the symptoms which precede death from putrid poisoning, to which he gave the name of "septicæmia," which means literally putrid poison in the blood; and, whether the poison is regarded as a ferment, or a virus, the name would be equivalent to putrid blood.

This septic virus is not necessarily always the same, either in its nature or its effects; for it takes its origin in tissues whose nutrition is interfered with by what we call "acute inflammation," as well as in those which are dying, or dead, from crushing, bruising, or laceration. Neither is it always necessarily absorbed into the circulation, for a barrier of healthy granulations might prove an obstacle; in this event the virus may expend its noxious influence locally, in causing interference and delay in the process of repair, and giving rise to what is known as "unhealthy" or "diffuse" inflammation. It is analogous to the virus of pyæmia and of erysipelas, and, for aught we know to the contrary, may coexist with these in the system. The symptoms of septicæmia will next occupy us.

He placed putrefying blood in a bag of animal membrane, and immersed the whole in distilled water, which, after a few hours, was found to be full of bacteria. Inoculation with the blood produced the usual results, but inoculation with the water caused no septic symptoms whatever; on the other hand, the same blood, when subjected to various processes which removed or destroyed the bacteria, retained its virulence, and from these experiments he drew the conclusion that the virus of putrid infection is not an organized ferment, not bacteria, but an albuminoid substance.

Stimson, "Bacteria and their Effects," Popular Science Monthly February, 1875, p. 403.

[1] Stimson, *op. cit.*

ART. II.—*Pneumatometry: the New Means of Diagnosis in Diseases of the Respiratory Organs.*[1] By LOUIS ELSBERG, A. M., M. D., Professor of Laryngology and Diseases of the Throat in the Medical Department of the University of the City of New York, Fellow of the New York Academy of Medicine, etc.

Definition.—Pneumatometry (from πνευμα, "air," appertaining to the breathing, and μετρον, "measure,") is the method of measuring inspiratory and expiratory force. For clinical purposes, the extreme respiratory power is measured which the patient is capable of exerting. This maximum, which is nearly constant for the same person in normal condition, varies characteristically in disease. The great value of pneumatometry for diagnosis consists in the fact that each of the two phases of breathing, inspiration and expiration, can be measured objectively and in figures, showing the deviation from health of either the one or the other separately, as well as the relation of the two to each other.

History.—A century and a half ago the Rev. Dr. Hales engaged in some curious researches upon the air. In the course of his experiments, he had occasion to breathe out of and into closed air receptacles, and, being desirous of ascertaining the force he could bring to bear, employed a mercury manometer. So far as I can find out, he is the first who entered upon such an investigation. The book in which he made it known was printed in 1726. Speaking of the use of bladders or leather bags filled with air, for temporarily sustaining respiration in a room filled with suffocating vapors, in case of fire, for divers, etc., he says: "But in every apparatus of this kind great care must always be taken that the inspiration be as free as possible, by making large passages and valves to play most easily. For though a man by a peculiar action of his mouth and tongue may suck mercury 22 inches [about 558 millimetres], and some men 27 or 28 [685 to 712 millimetres] high, yet I have found by experience that, by the bare inspiring action of the diaphragm and dilating thorax, I could scarcely raise the mercury two inches [50 millimetres]. At

[1] Read before the Academy, October 7th, 1875.

which time the diaphragm must act with a force equal to the weight of a cylinder of mercury, whose base is commensurate to the area of the diaphragm and its height two inches, whereby the diaphragm must at that time sustain a weight equal to many pounds. Neither are its counteracting muscles, those of the abdomen, able to exert a greater force.

"For, notwithstanding a man, by strongly compressing a quantity of air included in his mouth, may raise a column of mercury in an inverted syphon, to five or seven inches in height [126 to 178 millimetres], yet he cannot, with his utmost strainings, raise it above two inches [say 51 millimetres] by the contracting force of the muscles of the abdomen; whence we see that our loudest vociferations are made with a force of air no greater than this."[1] I have quoted this passage in full here, because it is very interesting as presenting the result of the first pneumatometric investigation, although, as we shall see hereafter, the figures given do not accord with those that have since been ascertained.

Whether any one soon followed in the path of research thus opened up by Hales I do not know. More than a hundred years later, in 1844, Valentin published his text-book of "Human Physiology," and in it recorded his observations for determining manometrically the respiratory power of an adult healthy man. To the apparatus employed he gave the name Pneumatometer; it was a modified hæmadynamometer, and, simple as it was, the instrument was essentially the same as that in use at the present day.[2] In 1845 Mendelsohn published

[1] "Statical Essays: containing vegetable staticks or an account of some statical experiments on the sap in vegetables, being an essay towards a Natural History of Vegetation: of use to those who are curious in the culture and improvement of gardening, etc., also a specimen of an attempt to analyse the Air, by a great variety of chymio-statical experiments, which were read at several meetings before the Royal Society. By Steph. Hales, D. D., F. R. S., Rector of Farringdon, Hampshire, and Minister of Teddington, Middlesex. The third edition, with amendments." London, 1738, vol. i., pp. 270 and 271.

[2] "Lehrbuch der Physiologie des Menschen." Von Dr. G. Valentin, ordentl. Professor der Physiologie und vergleichenden Anatomie an der Universität Bern. Braunschweig, Friedrich Vieweg und Sohn, 1844, vol. i., p. 524, *et seq.*

some investigations in pneumatometry.[1] In 1846 Hutchinson followed with a large number of elaborately conducted observations and experiments.[2] In 1853 Donders added his valuable contributions.[3]

But notwithstanding the labors of these investigators—notwithstanding that the two last mentioned, Hutchinson and Donders, had even particularly pointed out the fact of the importance of these researches for recognizing disease—all these publications remained barren of practical results for medicine until Waldenburg, less than four years ago, introduced the method of pneumatometry as a means of diagnosis.[4] For eighteen months previous to that time Prof. Waldenburg had studied and tested the method, had demonstrated it in his courses to medical students, and had shown it to me during my stay in Berlin.

The Instrument.—Waldenburg made the original instrument of Valentin more convenient, and has described and figured it in his latest publication on the subject.[5] Eichhorst[6] has added to Waldenburg's apparatus an air-tight stop-cock, which I have replaced by an automatic valve.

[1] "Der Mechanismus der Respiration und Circulation oder das explicirte Wesen der Lungenhyperämien." Von A. Mendelsohn. Berlin, Behr'sche Buchhandlung, 1845.

[2] "On the Capacity of the Lungs, and on the Respiratory Function, with a View of establishing a Precise and Easy Method of detecting Disease by the Spirometer;" by John Hutchinson, Surgeon (with numerous Woodcuts). "Medico-Chirurgical Transactions," published by the Royal Medical and Chirurgical Society of London, vol. xxix. (second series, vol. xi.), London, 1846, pp. 137–252.

[3] "Beiträge zum Mechanismus der Respiration und Circulation im gesunden und kranken Zustande." Henle and Pfeufer's *Zeitschrift für rationelle Medicin*, N. F., Bd. iii., Heidelberg, 1853.

[4] "Die Manometrie der Lungen oder Pneumatometrie als diagnostische Methode." Von Prof. Dr. L. Waldenburg. *Berliner klinische Wochenschrift*, Jahrgang 8, No. 45, 1871, p. 541.

[5] "Die pneumatische Behandlung der Respirations- und Circulationskrankheiten im Anschluss an die Pneumatometrie, Spirometrie und Brustmessung. Bearbeitet von Dr. med. L. Waldenburg, Professor E. O. an der Kgl. Friedrich-Wilhelms-Universität in Berlin. Mit 30 Holzschnitten. Berlin, August Hirschwald, 1875.

[6] "Ueber die Pneumatometrie und ihre Anwendung für die Diagnostik der Lungenkrankheiten." Von Hermann Eichhorst aus Königsberg. *Deutsches Archiv für klinische Medicin*, Bd. xi., Heft iii., 1873, p. 268.

Fig. 1.

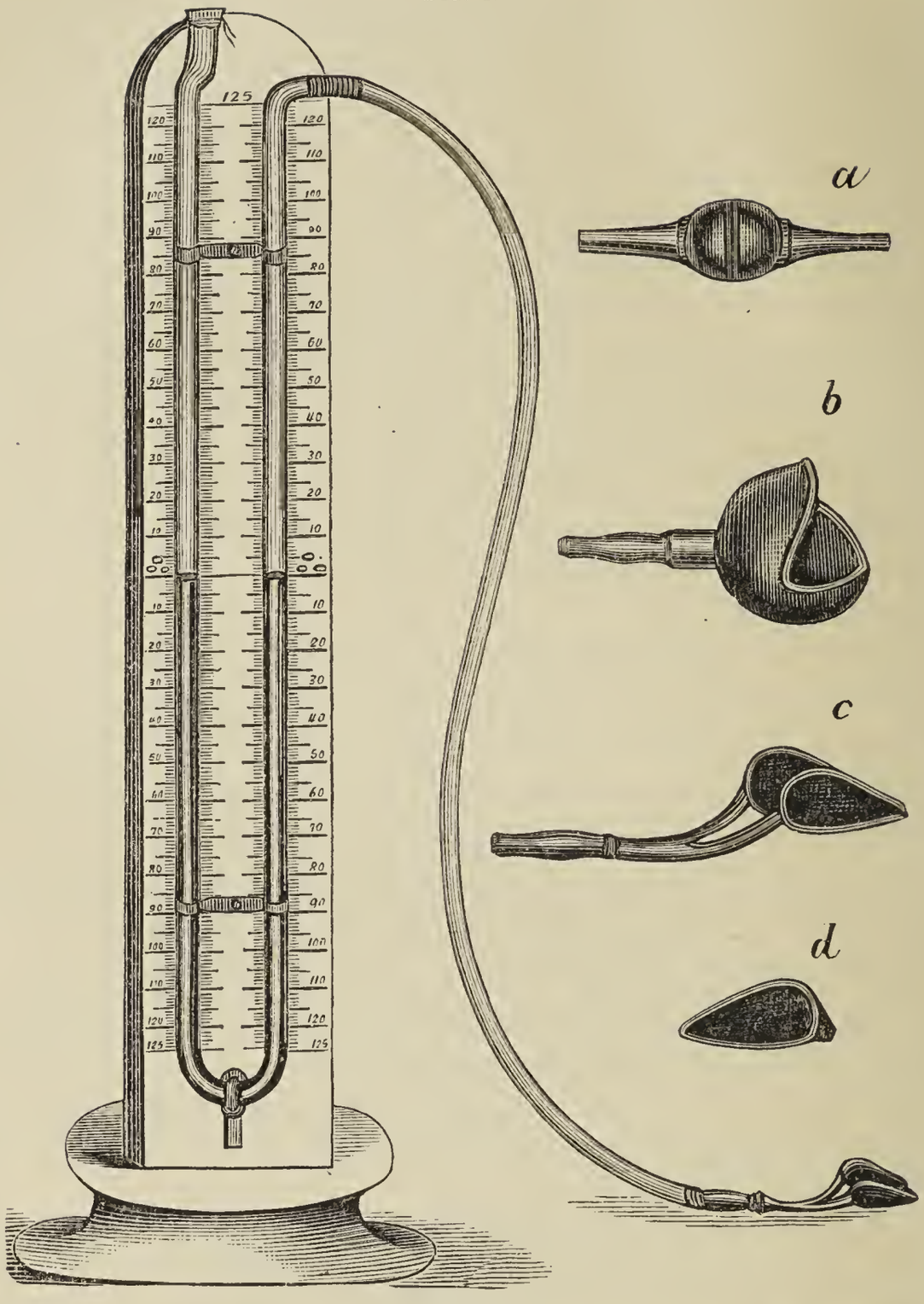

Fig. 2.

The pneumatometer, as I have had it constructed and represented in the above woodcuts, consists of a glass tube, bent upon itself so as to have two parallel limbs, attached to an upright metal scale. One end of the tube is expanded

to facilitate the pouring in of mercury; being in contact with the atmosphere, it is covered, after sufficient mercury has been poured in, with gauze to prevent the entrance of dust; the other end is bent at a right angle, and with it is connected, in an air-tight manner, a rubber tube through which the breathing is accomplished. The scale has a zero-line in the middle and 125 millimetres above and below for each side of the glass tube. In addition to two fastenings which keep the glass in front of the metal, there is a slit below, in which slides a rest for it, controlled by a screw behind; this facilitates getting the glass tube, after being about half filled with mercury, in the proper position upon the scale, viz., the level of the mercury in each limb of the tube being made to correspond with the zero-line. The breathing-tube leads, either with or without the intervention of the hard-rubber valve-tube (*a* in Fig. 1), to either nose or mouth-pieces (Fig. 2, and *c*, *d*, in Fig. 1) or a nose-and-mouth-mask (*b*, in Fig. 1), all of which will be more particularly described presently. The foot of the pneumatometer is of wood, and about two inches high; the upright metal piece about thirteen inches high and two inches wide; the glass tube nearly one-half inch thick. Both limbs of the glass tube should have exactly the same bore, so that the mercury in one rises exactly as much as it falls in the other, for, as the pressure upon the column of mercury is measured by the difference in level in the two, it would be necessary to note the number of millimetres both above and below zero, and add these together, if the two portions were of different bore, instead of simply noting one number and doubling this, as can be done if the bore is uniform. The valve-tube is about 6 inches long, and in the middle 1 inch thick, gradually getting thinner toward the ends, with a bore of nearly $\frac{1}{2}$ inch. It is reversible, so as to answer for both inspiration and expiration. The single nose-piece is a hard-rubber nozzle, $2\frac{1}{2}$ inches long, shaped so as to completely fill the nostril. Not more than two or three different nozzles are required for all the nostrils met with. The double nose-piece (Fig. 2) is a hard-rubber, hollow cylinder, $1\frac{1}{2}$ inch in diameter and the same in length, connected at one end with two soft-rubber pipes, $3\frac{1}{2}$ inches long, with $\frac{1}{2}$ inch bore, each terminating in a nozzle of hard rubber, like that of the single nose-piece,

and at the other end attachable, either directly to the breathing-tube of the pneumatometer, or, by means of a short piece of India-rubber tubing, to the valve-tube. As a rule, I use the valve-tube; when it is desirable to ascertain how long the patient can sustain a certain pressure at a certain point, I take it off. Whenever the nasal passages are free for respiratory purposes, I use the double nose-piece; sometimes, when breathing is impeded through one nostril, the single nose-piece for the other nostril. As mouth-piece, I use either my valve-tube or a tube just like it without a valve. The oro-nasal masks I employ are the same as Waldenburg's. They are hollow hemispheres of sheet-brass or tin, with an indentation for the nose, the free edge being covered with India-rubber to make it fit air-tightly to the face, and the dome pierced by a short tube, $\frac{3}{4}$ inch in diameter, which can be attached either to the valve-tube, or directly to the breathing-tube. Three or four different sizes of masks are required, varying in diameter from $2\frac{1}{2}$ to $4\frac{1}{2}$ inches.

The Mode of using the Instrument.—To carry out the method of pneumatometry is exceedingly simple; nevertheless, it must be thoroughly studied and practised before it can serve the purpose of diagnosis.

Upon breathing into the instrument, the pressure of the air upon the column of mercury with which it first comes into contact depresses the column, the mercury rises in the opposite limb of the glass tube, and the difference of level in the two limbs is the measure of the expiratory pressure exerted. This is the positive pressure. During inspiration, on the other hand, the mercury contained in the limb with which the breathing-tube is connected is sucked up, the column in the other limb falls correspondingly, and the difference in the levels of the mercury indicates the negative pressure of inspiration, which may be called the inspiratory traction. Thus, expiration yields us on the pneumatometer a positive, and inspiration a negative pressure.

In instructing the patient how to breathe, the very first question that must be met is, Shall he breathe through the nose, or mouth, or both? Hales seems to have used the mouth. Valentin employed three different methods, viz.: 1. He applied

a funnel-shaped mouth-piece, adapted to the form of the lips, air-tightly to the outside of the open mouth, closed both nostrils, and had both inspiration and expiration performed several times without taking the mouth-piece off. But, as the air between the lips of the patient and the column of mercury became, under these circumstances, soon unfit to sustain respiration, only the first few breaths were of any value. 2. He allowed inspiration through the open nose with closed lips, and measured only the expiration through the mouth-piece as before. 3. He varied the second method by having the nostrils open during the expiration. Mendelsohn introduced a nose-tube tightly into one nostril, and closed the other nostril and the mouth. Hutchinson proceeded in the same way. Donders had also both inspiration and expiration performed through the nose. Waldenburg tested the same procedure, but dropped it entirely, except for the very rare cases in which he finds the patient intractable for other methods, or in which he wants to control the other methods by an additional one; he uses a mouth-piece, introduced very far into the mouth, if borne by the patient, to the very root of the tongue, beyond the *isthmus glosso-palatinus*, with the lips tightly closed around, or he uses, what he prefers, a mask covering air-tightly both nose and mouth, the patient breathing both in and out with his mouth widely open. Nearly all who have practised pneumatometry since, have followed Waldenburg in preferring the mask. After experimenting a good deal with the mask, and with my nose-tubes, I must confess that I think the latter more exact and unchanging in results, in all cases where freely applicable, i. e., where there is no obstruction to breathing by swelling, mucus, or otherwise, or where its use is not annoying to the patient. But Waldenburg's method of breathing through the mask yields good results, and I frequently employ it—and also the mouth-piece—in conjunction with the method of breathing through the nose-piece. In cases of catarrh or obstruction of the nose, I frequently, also, place Waldenburg's and my methods in juxtaposition, to determine the difference of the manifestation of respiratory power caused by the difficulty of breathing through the nose. Whenever the patient uses the nose-piece, he must keep the mouth shut.

Like Eichhorst (*op. cit.*), I have found that the sources of error which Waldenburg has very properly pointed out, can be avoided by attention and properly instructing the patient. These sources of error arise from the powers of suction and expulsion that can be exercised by the muscles of the mouth and throat; from inattention on the part of the patient to what he is doing, in breathing *out* during intended inspiration, and *in* during intended expiration; and from breathing irregularly and repeatedly in one effort.

The breathings should be deep, and with the exertion of all the power of which the individual is capable. Before breathing into the instrument, I let him fill his lungs well. After each expiration, I give him a moment's rest, during which he breathes naturally; he then takes a deep inspiration and makes another expiratory effort. The first few trials I hardly ever count. I show him just how to do it, and usually after the fourth or fifth experiment—in the case of an exceptionally unteachable patient, not until after the tenth or twelfth—he avoids all sources of error. I then try him (after a rest, if he is weak) five or six times more, and note down the maximum pressure attained in any one of these successful efforts. These last five or six experiments, as a rule, give the same or nearly the same result, which I have found unvarying, even at repeated rests at irregular intervals—a reasonably sure indication that it is pretty nearly correct. After finishing with the expiration, I proceed to measure the inspiratory power in a similar manner. Waldenburg found, however, that it is immaterial whether an ordinary or a deep expiration precedes the inspiration to be measured, and I have come to hold the same opinion.

In both phases of respiration, a difference can be made between a forcible effort and a slower, gradually increasing, but nevertheless as powerful, exertion. In the former, a greater pressure is attained for a moment, which sinks rapidly; but, in the latter, the column of mercury can be sustained at a certain height for one or more seconds. As I usually attach to the pneumatometer my valve-tube, which maintains the pressure achieved, I make use of the former mode, which upon the whole is certainly preferable; but occasionally I re-

move the valve-piece, and measure by the other mode as well. The latter, of course, gives smaller and more complicated results.

I must give a caution in regard to reading the scale. I have already mentioned that the bore of the two limbs of the tube containing the mercury should be uniform, in order that the pressure be correctly attainable by simply doubling the number of millimetres above or below the zero-line indicated in either limb. Every one can easily ascertain whether in this respect his pneumatometer is trustworthy, by determining whether the level of the mercury is at exactly the same figure in each limb. But the mercury, on account of its adhesion to the glass, has a convex surface in the tube, and care must be taken to note the tangential line. A mistake will certainly be made if the level of the observer's eyes be either too high or too low.

Immediately after a full meal, the respiratory power, especially the expiratory, is usually diminished, and the measurement is not reliable.

Pneumatometry in Health.—We have seen that Hales came to the conclusion that about 50 millimetres is the maximum attainable during inspiration "by the bare inspiring action of the diaphragm and dilating thorax;" and also during pure expiration, even with the "utmost strainings." He very properly excluded oral suction and expulsion as sources of error, but I suspect that his apparatus was not perfectly air-tight, and that therefore his figures are too low. Valentin obtained, in the cases of four different individuals, the following maxima: 1, deepest inspiration —130 millimetres, most forcible expiration +80 millimetres; 2, forced inspiration —232, forced expiration +256; 3, forced inspiration —220, forced expiration +256; 4, forced inspiration —58, forced expiration +224. In later publications, Valentin reports still higher figures, viz.: —232 to —266 millimetres for inspiration, +260 to 326 millimetres for expiration.[1] Waldenburg says, and I agree with him, that these figures are explicable only

[1] From the fourth edition of his "Grundriss der Physiologie," Braunschweig, 1855, as quoted by Waldenburg, "Die pneumatische Behandlung," etc., p. 2.

by assuming that instead of, or together with, inspiration, the aspiratory power of the mouth, and instead of, or together with, expiration, the power of expulsion of the mouth, entered into the measurement. Mendelsohn found, as the mean of experiments on seven persons —87 millimetres for forced inspiration, and +113 to 122 millimetres for forced expiration. In the different individuals the inspiratory power varied from 52 to 117 millimetres, the expiratory from 85 to 170 millimetres. The expiratory pressure always exceeded the inspiratory traction, say, by about one inch, or 26 millimetres. These figures, it will be seen further on, agree very well with my own. Hutchinson obtained figures also very accurate, although his average is smaller than mine. He constructed a table on his instrument, of which he says, "Certain words are marked on the plate, their position having been determined by 1,500 experiments." He gives his figures in inches, which I have calculated in millimetres, omitting fractions of a millimetre under $\frac{1}{2}$, and reckoning fractions over $\frac{1}{2}$ as a whole millimetre:

Inspiratory power ranging about:	Characterization.	Expiratory power ranging about:
38 millimetres.	"Weak."	51 millimetres.
51 "	"Ordinary."	63 "
63 "	"Strong."	89 "
89 "	"Very strong."	114 "
114 "	"Remarkable."	147 "
140 "	"Very remarkable."	178 "
151 "	"Extraordinary."	216 "
178 "	"Very extraordinary."	254 "

He adds, "It will be observed that the figures on each side of the same word differ in their value, the expiratory side ranging about $\frac{1}{3}$ higher, because the power manifested (I do *not* mean power exerted) by these muscular efforts varies in this relation." This is certainly very frequently true, but occasionally the relation between the expiratory and inspiratory powers varies within very wide limits even in health, although the former is always greater than the latter. As an average, Hutchinson obtained about —76 millimetres for inspiration,

and about 100 millimetres for expiration, for men. He does not seem to have determined the respiratory power of women. A certain relation exists, according to Hutchinson, between the height and the respiratory power, and he gives the following as the mean correspondence during health:

Height	Up to 5 ft.	5 ft. 1 in.	5 ft. 2 in.	5 ft. 3 in.	5 ft. 4 in.
Inspiratory power in inches	2.55	2	2.52	2.31	2.70
Expiratory power in inches	3.28	3.36	3.23	3.15	4.32

Height	5 ft. 5 in.	5 ft. 6 in.	5 ft. 7 in.	5 ft. 8 in.	5 ft. 9 in.
Inspiratory power in inches	2.84	2.70	3.07	2.96	2.91
Expiratory power in inches	4.33	3.87	4.18	4.13	4.28

Height	5 ft. 10 in.	5 ft. 11 in.	6 feet.	Over 6 ft.
Inspiratory power in inches	2.83	2.77	2.65	2.67
Expiratory power in inches	3.94	3.63	4.48	4.41

According to this, at the height of 5 feet 7 inches and 5 feet 8 inches, the inspiratory power is greatest, and thence the strength gradually decreases as the stature increases. The men of 5 feet 7 and 8 inches elevate a column of about 3 inches of mercury = 76 millimetres: this Hutchinson calls a "healthy power." The men of 6 feet have the greatest expiratory power, viz., one of about $4\frac{1}{2}$ inches = 114 millimetres. But Hutchinson says, "The expiratory power I do not consider such a test of strength, or, if I may be allowed the term, the *vis vitæ*, as the inspiratory." He refers here to the influence of vocation and habits upon the expiratory function. I have not been able to confirm this relation between the height of a person and his inspiratory and expiratory power. Donders published figures which are rather small; like Valentin, Mendelsohn, and Hutchinson, he found the expiratory power to exceed the inspiratory. He gives the negative pressure, for forced inspiration, as being from 36 to 74 millimetres, the positive pressure, for forced expiration, from 82 to 100 millimetres.

Waldenburg declares, as the result of his numerous observations, that the figures vary within wide limits: "Healthy adult men, who are not especially strong, reach on the aver-

age, by forced inspiration, a negative maximum pressure of 80 to 100 millimetres, by forced expiration, a positive maximum pressure of 100 to 130 millimetres. Very strong muscular men often considerably exceed these figures; they may attain by inspiration to from 120 to 160 millimetres, by expiration to from 150 to 220 millimetres. Weak persons, on the other hand, give lower rates; however, if they are healthy, we may regard for adult persons of the male sex 70 millimetres as the minimum negative, or inspiration, pressure, and 80 millimetres as the minimum positive, or expiration, pressure. Women can reach only considerably lower rates than men. With them, on an average, the negative pressure of forced inspiration amounts to from 60 to 80 millimetres, the positive pressure of forced expiration to from 70 to 110 millimetres. Higher figures are reached only by few. In the case of healthy women, about —50 millimetres may be regarded as the minimum for forced inspiration, +60 millimetres for forced expiration. Children of the age of about ten years and over usually show rates which correspond entirely, or nearly (with a difference of perhaps 10 to 20 millimetres), to the minimum of adults. Not a few children, indeed, reach the average of adults. I have, however, not a sufficiently large number of observations to be able to give exact figures for children of the various ages. The same is true of very advanced age. Here, I can state only this, that in the case of old men (sometimes, indeed, already at an age of beyond sixty years) the pneumatometrical figures fall to near the minimum, or even below this. All these numbers refer to the maxima obtained by forcible inspiration and expiration. The figures are much smaller for the more slow inspiration and expiration, gradually increasing in power, with which the person is able to maintain the pressure at the height for one or more seconds. With healthy adult men, the force of inspiratory traction observed in this manner varies from 50 millimetres to, at the most, 120 millimetres, the expiratory pressure from 60 to 150 millimetres; the mean values are, for inspiration, 60 to 90 millimetres, for expiration, 70 to 100 millimetres. With women, inspiratory traction reaches some 25 to 60 millimetres, expiratory pressure, 30 to 80 millime-

tres."[1] Waldenburg's figures closely, upon the whole, correspond to those which I have obtained by the examination of healthy persons; the extremes are within nearly the same limits, and I regard his results as very reliable. Eichhorst's figures (*op. cit.*) are smaller than Waldenburg's and mine, but he practised the mode of slow and gradual, though deep, rather than quick and forcible, respiration. His averages, obtained from twenty-four men, are 44 millimetres for inspiration, 60 millimetres for expiration; from eighteen women, 26 millimetres for inspiration, 36 millimetres for expiration. His lowest figures among men are, for inspiration, 17 millimetres (found in two cases, one a laborer fifty-one years old, with expiratory power of 35 millimetres, the other a merchant fifty-two years old, with expiratory power of 26 millimetres), for expiration, 26 millimetres (the case of the merchant just mentioned); among women, for inspiration, 11 millimetres (in a laborer's widow, fifty-three years old, whose expiratory power is given as 25 millimetres), for expiration, 25 millimetres (found in the case of this widow, and in that of a servant-girl of nineteen years, whose inspiratory power was 24 millimetres). His highest figures among men for inspiration are 86 millimetres (in the thirteen-years-old son of a shoemaker, whose expiration measured 91 millimetres), for expiration, 94 millimetres (in a student aged twenty-three years, whose inspiratory power was 82 millimetres); among women, for inspiration, 42 millimetres (in a girl of sixteen years, who worked in a factory, whose expiration measured 47 millimetres), for expiration, 55 millimetres (in a laboring woman, fifty-one years old, whose inspiration reached only 25 millimetres). Lassar,[2] who measured, not the maximum respiratory power of which the individual was capable, but took the average of a number of experiments, gives as the average of such averages, for breathing through the mouth, 50 millimetres for forced inspiration, and 60 millimetres for forced expiration; for breathing through one nostril, for forced

[1] "Die pneumatische Behandlung," etc. (*op. cit.*), p. 27.

[2] "Zur Manometrie der Lungen. Inaugural-Abhandlung, der medicinischen Facultät zu Würzburg vorgelegt." Würzburg, 1872. Waldenburg, "Die pneumatische Behandlung," etc., p. 28.

inspiration, 41 millimetres, for forced expiration, 52 millimetres.

The result of my own investigations of pneumatometry in over 100 healthy persons is, briefly stated, as follows: For the male sex, the average of the maximum inspiratory power is —86 millimetres, the average for the maximum expiratory power +110 millimeters; for the female sex, the average of the maximum of forced inspiration —50 millimetres, that of the maximum of forced expiration +70. The highest figures I have met with in strong, healthy men are 170 millimetres for inspiration, and 230 millimetres for expiration. This is very exceptional, however. The maxima I have observed in healthy women—found also only very rarely—are 90 millimetres for inspiration, and 120 for expiration. The minimum of respiratory power compatible with perfect health in women, I am forced to place much lower than Waldenburg has done; as to men I am disposed to agree to his minimum figures, although all the healthy adult males that I have examined showed greater power than he gives as the minimum met with. I have full records of twenty-five individuals of each sex, subjectively in perfect health, who have been carefully clinically examined, more especially as to the condition of the respiratory organs, but really also as to the condition of other organs, stating age, occupation, habits, build, weight, height, trunk measurements and lung capacity (vital ratio), physical signs on examination of chest, previous history and present state in other respects, and respiratory power as shown by the pneumatometer. These records show that an adult woman may enjoy perfect health and yet not be able to reach on the pneumatometer a higher figure than —20 millimetres as the maximum for forced inspiration, and +30 millimetres as that for forced expiration. The lowest figures yielded by any one of the twenty-five healthy males were those of a strong, florid-complexioned gentleman of fifty-three years, viz., —74 millimetres inspiration, and 86 millimetres expiration.

With healthy children under ten years I have had very little experience. A boy of eight years has registered —50 for inspiration, and 70 for expiration; and a little girl of seven, very strong, however, for her age, —36 for inspiration, and

between 40 and 50 for expiration. These are the highest figures reached. Children over ten years usually exhibit almost the same latitude and nearly the same figures as adults. In old age the figures often become surprisingly small. As a rarity I must mention the case of a hale and hearty gentleman, seventy-five years of age, who registered —112 millimetres for inspiration, and 130 millimetres for expiration.

I will add Prof. Waldenburg's respiratory power as shown by the pneumatometer, reported by himself, and my own:

I. Waldenburg's vital lung capacity: 3,000 cubic centimetres.

A. Breathing through a mouth-piece.

1. Inspiration.

a. Quick, forced inspiration. The mercury rapidly rises in one limb of the glass tube to 70 millimetres above zero, but sinks at once and keeps playing about a much lower point. The maximum inspiratory power is, therefore, —140 millimetres.

b. Slower, but the deepest possible, inspiration. The negative pressure increases slowly until it reaches 100 millimetres, then falls to 80 millimetres, and for two seconds varies from 40 to 80 millimetres and from 50 to 70 millimetres. The average number is, therefore, 60 millimetres, and about this point, indeed, the mercury remains longest.

2. Expiration—after deep but not strained inspiration.

a. Quick, forced expiration. The maximum pressure attained for a moment amounts to 150 millimetres.

b. Slowly-increasing, powerful expiration. The pressure of 100 millimetres is reached, then the column of mercury falls and pendulates up and down, indicating for four seconds from 60 to 80 millimetres, and about half that time a few millimetres above or below 70 millimetres.

The measures of inspiration, as well as of expiration, are the same whether the nose is closed or not.

B. Breathing through a nose-piece [through one nostril].

1. Inspiration.

a. Quick, forced inspiration. For a moment a negative maximum pressure of 140 millimetres is attained with immediate falling of the mercury.

b. Slow, very deep inspiration. After reaching 100 millimetres, falling and pendulating of the mercury for three seconds at from 40 to 80 millimetres. Average 60 millimetres.

The figures are the same, whether the second nostril remains open or is closed with the finger. The nostril closes involuntarily of itself during the inspiration.

2. Expiration—after deep but not strained inspiration.

a. Quick, forced expiration. Maximum reached for a moment 170 millimetres.

b. Slow, profound expiration. The pressure rises to 100 millimetres, varies for two seconds between 100 and 70 millimetres, and then remains for two seconds longer at 70 millimetres.

Throughout this experiment the second nostril was closed with the fingers. In other experiments, during which it had been left open, the numbers obtained were very much smaller and indeed useless, on account of the unimpeded egress of air through it. The maximum of expiratory power with open nostril amounted to only 110 millimetres.

C. Breathing through the mask.

1. Inspiration.

a. Forced, quick inspiration. Maximum, for a moment, —130 millimetres. Rapid fall.

b. Slower, deep inspiration. The negative pressure increases slowly to about 100 millimetres, then trembling movements of the mercury indicate from 50 to 70 millimetres for one and a half second. Mean: —60 millimetres.

2. Expiration after deep but not strained inspiration.

a. Quick, forced expiration. For a moment 140 millimetres pressure is reached; mercury falls quickly.

b. Slower, strong expiration. Hovering of the mercury, for one and a half second, between 60 and 80 millimetres. Mean: 70 millimetres.

II. As to myself (data of over a year ago), age thirty-eight years; strong and muscular; weight, without clothes, 157 lbs.; height (five feet seven and three-quarters inches), 172 centimetres; height of trunk, measured from seventh cervical vertebra to end of coccyx, 66 centimetres; periphery, measured about 3 centimetres below nipple, 81 centimetres; vital lung

capacity, 4,300 cubic centimetres (vital ratio, i. e., the relation of the "vital lung capacity" to the cubic contents of the trunk, 8.02); lungs healthy.

A. Breathing through a mouth-piece.

1. Inspiration.

a. Quick, forced inspiration. Maximum negative pressure 110 millimetres, with rapid sinking of the mercury.

b. Slow, deep inspiration. Mercury sustained for three and a half seconds between 40 and 60 millimetres negative pressure. Mean: —50 millimetres.

2. Expiration after deep but not strained inspiration.

a. Quick, forced expiration. Maximum, reached but for a moment, 130 millimetres.

b. Slow, unexcited, but powerful expiration. The mercury kept for over three seconds between 60 and 80 millimetres, longest about the mean of these figures, viz.: 70 millimetres.

No difference is observed in these results whether the nose is held shut or not.

B. Breathing through my double nose-piece. (For convenience of experimenting, breathing out was accomplished through the mouth when testing the inspiration, and breathing in when testing the expiration, which, it was found, did not disturb the mercury.)

1. Inspiration.

a. Quick, forced inspiration. Maximum —130 millimetres, reached with quick descent and oscillation of the mercury.

b. Slow and deep inspiration. A pressure of —120 millimetres is registered for a moment, and one of from —80 to —40 millimetres kept up for several seconds; most of the time about 60 millimetres.

2. Expiration after deep but not strained inspiration.

a. Quick, forced expiration. Maximum obtained, 150 millimetres.

b. Slow and powerful expiration. A pressure of 100 millimetres for an instant, one of 90 for a little longer, and a varying one from 50 to 80 millimetres for two and a half seconds is reached.

C. Breathing through the mask.

1. Inspiration.

a. Quick, forced inspiration. Maximum —130 millimetres.

b. Slow and deep inspiration. After the negative pressure of 120 millimetres has been just touched, it plays about —60 millimetres as a central point for nearly two seconds, varying from 10 to 15 millimetres above and below.

2. Expiration after deep but not strained inspiration as before.

a. Quick, forced expiration. Momentary maximum pressure, 150 millimetres.

b. Slow, strong expiration. The mercury, slowly descending, marks for more than two seconds a pressure varying from 60 to 80 millimetres.

Pneumatometry in Disease.—We have seen that in the normal condition the positive or expiration pressure is greater than the negative or inspiration pressure. We have also seen that, although the latitude of variation within the limits of health is a very great one, we still recognize for each sex a certain normal average and requisite minimum of inspiratory and expiratory power. Upon these considerations Waldenburg based his division and classification of the pathological breathing revealed by the pneumatometer. He made two groups, each of which he subdivided into three classes, viz.:

Group I.—Characterized by the inversion of the normal relation between expiratory and inspiratory pressure; the positive pressure is smaller than the negative—there is an insufficiency of expiration.

Class 1.—With the insufficiency of expiration, the inspiratory pressure is normal.

Class 2.—With the insufficiency of expiration, the inspiratory pressure does not reach the normal minimum; inspiration is therefore also insufficient; nevertheless, the expiratory pressure is still less than the inspiratory.

Class 3.—With the insufficiency of expiration, the inspiratory pressure is larger than normal.

Group II.—Characterized by insufficiency of inspiration, the normal relation between expiratory and inspiratory press-

ure being preserved; the negative pressure is smaller than the positive.

Class 4.—With the insufficiency of inspiration, the expiratory pressure is normal.

Class 5.—With the insufficiency of inspiration, the expiratory pressure, although larger than the inspiratory, does not reach the normal minimum; expiration is therefore also insufficient.

Class 6.—With the insufficiency of inspiration, the expiratory pressure is larger than normal. Waldenburg has added this class for the sake of completeness, admitting that he has never seen a case in point. It is difficult to conceive of a disease bringing about such a condition unless, perhaps, where, with normal inspiration, the expiratory power has become preternaturally strong through habits, vocation (that of "glass-blower, trumpeter, wrestler"), and the like, and disease should then interfere with inspiratory power and leave the expiratory at first still greatly in excess; thus Hutchinson reports the case of a wrestler in whom he found "the expiratory power exceed nearly four times that of the natural inspiratory power, which vast preponderance was purely the effect of his favorite amusement."

As Waldenburg has shown, the inspiratory traction as well as the expiratory pressure is a product of various factors, some of a positive, some of a negative character. These factors are: 1. *The muscular power.* 2. *The elasticity of the lungs.* 3. *The obstacles presented by the walls of the chest, its contents and their surroundings.*

"In *inspiration*, the set of muscles brought into action for forcibly breathing air into the lungs forms the only positive factor. The muscular force has, on the one hand, to work against the elasticity of the lung-tissue which opposes expansion; on the other hand, it has to overcome the obstacles to change in the form of the thorax. These obstacles are principally the force of gravity of the thoracic wall which has to be overcome in raising the ribs; the change of form and position to which the thorax and its contents—lungs, heart, vessels, and pleura—are exposed by expansion of the chest; the elasticity of the walls of the thorax; the difference of pressure

between the outer atmosphere and the somewhat rarefied air within the lungs; and, finally, the abdominal tension resisting the lowering of the diaphragm.

"The case is different in *expiration*. Of course, the muscles coming into action for forcibly breathing air out form the main factor of the pressure produced. But the obstacles to inspiration are also active in favor of expiration. The pulmonary elasticity is an aid to expiration, increasing its power. Gravity also, and the other obstacles, directly aid expiration, as the parts disturbed tend of themselves to return to their former position. Only in very forced expiration—when the thorax is compressed beyond its former or balanced condition—new obstacles arise, expiratory obstacles in contradistinction to inspiratory obstacles, while the elasticity of the lungs still continues to act in favor. *Thus, in inspiration, the muscular power forms the positive, the elasticity of the lungs and the obstacles the negative, factors; while in expiration all these three factors are positive ones, with only a relatively small negative one from expiratory obstacles.*" [1]

Waldenburg has laid down the following general propositions:

1. By muscular atrophy or diminution of muscular strength, the pneumatometrical figures are reduced, the inspiratory and expiratory about equally if the disease of the muscles be general; but the former or the latter alone, or one more than the other, if the disease affect only single groups of muscles, especially subservient more to either inspiration or expiration. *Cæteris paribus*, an increase of muscular power increases in like manner the figures registered on the pneumatometer.

2. A diminution of the elasticity of the lungs reduces the pressure of expiration and tends to increase the negative pressure of inspiration.

3. An increase of inspiratory obstacles reduces the power of inspiration and increases that of expiration, in case expiratory obstacles are not present at the same time. But, on the other hand, there may appear expiratory obstacles, while the inspiratory obstacles are not at all or only slightly in-

[1] "Die pneumatische Behandlung," etc., pp. 53, 54.

creased. In such cases the expiratory power alone, or mainly, will be reduced.

Hutchinson says, "As it is a common rule that inflammation and disease in general are attended with pain on pressure, these also may be perceived by the diminished power manifested on the instrument which measures the pressure exerted." He then gives a table showing the difference between the inspiratory power of the healthy and that of the diseased, and adds, "This difference is about one-half, as might be anticipated, because weakness is the most prominent symptom of disease."[1]

Among the individual diseases, in obscure or incipient cases of which pneumatometry has furnished most important aid in diagnosis, pulmonary emphysema and phthisis must first be named; but it has already been called into requisition not only in other diseases of the respiratory organs, but also in diseases of the circulatory and other organs.

I. **Diseases of the Respiratory Organs.** 1. *Pulmonary Emphysema.*—Donders already has pointed out that vesicular emphysema must be accompanied with diminution of pulmonary elasticity. Waldenburg has discovered and demonstrated that pneumatometry is a means with which we can detect emphysema in its incipient stage, while yet all other methods of examination fail; this, too, even when no actual subjective disturbances exist at the time; and, moreover, pneumatometry enables us to distinguish with probability between the various forms or stages of emphysema. In all cases there is dilatation of the terminating vesicles of the lungs, and "either an abnormal accumulation of air within the air-cells, or an infiltration of air into the sub-pleural and interstitial connective tissue."[2] The various forms or rather stages come all under the head of Waldenburg's first group of pathological breathing, viz., that characterized by the inversion of the normal relation between expiratory and inspiratory pressure; the

[1] *Op. cit.*, pp. 225, 226.

[2] "Lectures on Diseases of the Respiratory Organs, Heart, and Kidneys." By Alfred L. Loomis, M. D., Professor of Pathology and Practical Medicine in the Medical Department of the University of the City of New York, etc., etc. New York: William Wood & Co., 1875, p. 79.

positive pressure is smaller than the negative, there is insufficiency of expiration. The incipient stage or slightest degree of the disease belongs to the first class, i. e., with little or much insufficiency of expiration, the inspiratory pressure is normal; the most severe form belongs to the second class, when, together with the insufficiency of expiration, the inspiratory pressure, also, does not reach the normal minimum, i. e., when inspiration is also insufficient, though nevertheless the expiratory pressure is still less than the inspiratory; while the cases belonging to the third class, where with the insufficiency of expiration the inspiratory pressure is larger than normal (which, however, is more difficult, if not impossible, to determine, unless the patient's inspiratory power has been examined during health and known for comparison), constitute the compensatory form, and may be ranged as to severity between those of the first and second classes.

I could append a large number of cases both from my own experience and those reported by others, but I will only mention, exceedingly briefly, a few illustrative cases:

L. P., aged forty years; merchant; complains of dyspnœa on any unusual exertion. This has probably occurred for years, but increased so gradually that he hardly noticed it until the last two or three months. No cough, no expectoration. Inspection, percussion, and auscultation, reveal nothing abnormal. Health otherwise excellent. Pneumatometer showed inspiration —120 millimetres, expiration 92 millimetres.

H. S., aged thirty-five years; broker. Has had a cough off and on for over five years; is out of breath very easily on walking fast, going up-stairs, etc. Lungs extend lower down than normally, and heart, partly covered, is pushed downward and toward middle line. Respiratory murmur enfeebled, expiration-sound prolonged, some "rustling." Inspiratory power —130 millimetres, expiratory 70 millimetres.

W. H., aged fifty-two years. Has greatly suffered from shortness of breath on exertion ever since he can remember, much worse during the last year. Dilatation of the chest very marked, "barrel-shaped;" percussion-sound abnormally clear, "vésiculo-tympanitic;" auscultation-sound almost sup-

pressed, sibilant in many places. Inspiration —40 millimetres, expiration 30 millimetres.

Mrs. R., aged thirty-eight years. Previously remarkably healthy; has suffered from dyspnœa on exertion for three years. Has had to give up singing. Now suffers from great oppression each time she walks a few steps. Heart covered, liver pushed down; harsh vesicular breathing. Inspiration —20 millimetres, expiration 16 millimetres.

2. *Asthma.*—Emphysematous persons are so liable to attacks of asthma, and asthma, when it comes itself from other causes, is so apt, perhaps so certain, sooner or later to produce emphysema, that the results of pneumatometry in asthmatic patients may frequently be ascribed to the coexistence of emphysema. But, independently of the latter, there exists during the paroxysm an expiratory insufficiency which the pneumatometer registers for some time thereafter, as in a case of seemingly uncomplicated spasmodic asthma in a man, twenty-eight years old, whose inspiration measured during the interval —50 millimetres, expiration 34 millimetres.

3. *Bronchitis.*—We can say of bronchitis—at all events, of chronic or frequently-recurring bronchitis—that it is very frequently associated with pulmonary emphysema, and that it must, then, exhibit the pneumatometrical measures peculiar to the latter; but in many cases where this is to be excluded, as, for instance, in some cases of acute bronchitis, both primary and secondary, we also find insufficiency of the expiration. Waldenburg explains this by assuming that by narrowing of the smallest bronchioles on the one hand and pulmonary hyperæmia on the other, the expiratory pressure is in such cases interfered with, while the inspiratory remains unaffected. At all events, he and Eichhorst report cases in point, and I will add the following: J. B., a middling-strong man, in somewhat impaired health, however, for some time, took a very severe cold, with the symptoms of acute bronchitis. Auscultation revealed rather feeble respiratory murmur and sibilant *râles*. He has a frequent, hacking cough, which gives him a sense of rawness in the upper portion of the chest. Inspiratory power —86 millimetres, expiratory 60 millimetres.

4. *Pulmonary Phthisis.* — Hutchinson, who has made

many hundred pneumatometrical observations on persons suffering from disease, has left us the following record of what he found in some cases of consumption:

Case I.—Incipient phthisis. Age, thirty years; weight, ten stone three pounds; height, five feet eight inches; pulse while sitting, 100; number of respirations per minute while sitting, 28; circumference of chest, 36 inches; mobility of chest, 1½ inch; vital capacity, 186 cubic inches; power of inspiration 0.70, of expiration 0.80 inch = inspiratory power —18 millimetres, expiratory 20 millimetres.

Case II.—Phthisis. Age, sixty years; weight, ten stone; height, five feet eleven inches; pulse while sitting, 60; respirations per minute, sitting, 40; circumference of chest, 35¼ inches; mobility, 1½ inch; vital capacity, 108 cubic inches; power of inspiration 0.75, power of expiration 0.46 inch = inspiratory power 19 millimetres, expiratory 12 millimetres.

Case III.—Phthisis. Age, thirty-six; weight, ten stone; height, five feet nine inches; pulse sitting, 100; respirations per minute, sitting, 40; circumference of chest, thirty-five inches; mobility, one inch; vital capacity, 80 cubic inches; power of inspiration 1.50, of expiration 2 inches = inspiratory power —38 millimetres, expiratory 50 millimetres.

Case IV.—Phthisis. This is the case of Freeman the "American Giant," and in it the pneumatometer as well as the spirometer *indicated* "the commencement of the disease which ultimately caused his death, and that *before* the usual means availed." I shall quote the full details which Hutchinson relates, viz.: "This man came over to England in 1842, and in the November of that year trained for a prize-fight; I examined him immediately before his *professional engagement*, when he might be considered in the 'best condition.' His powers were as follows: vital capacity four hundred and thirty-four cubic inches; height 6 feet 11¼ inches; weight nineteen stone and five pounds; circumference of his chest forty-seven inches; inspiratory power 5.0 inches; expiratory power 6.5 inches. In November, 1844, exactly two years afterward, he came to town in ill-health. I then examined him in the same way as before, twenty times at various intervals, during which his vital capacity varied from 390 down to 340, and the mean

of all the observations was 344 cubic inches, a decrease of ninety, or more than twenty per cent., his respiratory power had decreased one-fifth, and his weight two stone. At this time I took him to two physicians well skilled in auscultation, and they both affirmed that they could *not detect* any organic disease. After January, 1845, I lost sight of Freeman, and in the October following I was kindly favored with the following account of him from Mr. Paul, surgeon to the County Hospital, Winchester: 'Freeman was admitted into this hospital on the 8th of October, in an extreme state of debility and exhaustion; he was reduced almost to a skeleton, complained of cough, and was expectorating pus in large quantities. Percussion on the anterior part of the chest, *under the clavicles*, gave on the right side a very dull sound; on the left one much clearer, but still, I think, less resonant than natural; I made but one attempt at auscultation, but could come to no conclusion, from a rather singular reason: the ribs were so large, the intercostal spaces so wide and so sunk in from the extreme state of emaciation to which Freeman was reduced, that I could not find a level space large enough to receive the end of the stethoscope; could not, in short, bring its whole surface into contact with the chest. Freeman's great debility and the clearness of diagnosis from other sources prevented my repeating the attempt. Freeman, after death, measured 6 feet $7\frac{1}{2}$ inches and weighed ten stone and one pound. On opening the chest, the lungs on both sides were found adhering by their apices to the superior boundaries of the thorax, and studded throughout their substance with tubercles. The tubercles, on the whole, were much less numerous in the right lung than in the left; both lungs were nearly healthy at their base; the tubercular matter gradually increased in quantity toward their upper part, and the apices of both lungs were almost completely occupied by large cavities, partly filled with pus, and capable of containing two or three ounces of fluid each. The heart was remarkably small. The rest of the viscera appeared healthy.'" [1] In this case, the inspiratory power, from having been 127 millimetres during health, had become

[1] *Op. cit.*, p. 219.

reduced to about 100 millimetres at a time when percussion and auscultation did not yet reveal any change.

In his first publication on the subject, already, Waldenburg stated that in phthisis the inspiratory pressure becomes at once diminished, while the expiratory, usually, for some time nearly normal, is more slowly lessened and remains larger than the inspiratory. The breathing of phthisical patients belongs, therefore, to the second group, viz.: that characterized by insufficiency of inspiration, the relation between expiratory and inspiratory pressure being normal, the negative smaller than the positive. This is so entirely different from what the pneumatometer shows in bronchitis and emphysema that it is of great value for differential diagnosis in doubtful cases, especially of incipient phthisis. As the disease advances and involves more and more of the lung-tissue, the negative pressure becomes smaller and smaller, in extreme cases sinking to most insignificant values. At the same time the positive pressure diminishes, preserving its relation; but, though continuing to preponderate, it, too, becomes very greatly reduced; in severe cases to 10 millimetres, and even below this figure. Waldenburg and Eichhorst have reported numerous cases. I have a large number in my books, from which I will transcribe the following, omitting all details:

S. D., aged thirty years. Phthisis, first stage, right apex posteriorly. Inspiration —60, expiration 100 millimetres.

Miss F., aged twenty-three years. Phthisis, first stage, both apices (hæmoptysis several years ago). Inspiration —18, expiration 36 millimetres.

E. B., aged forty-two years. Phthisis, evidences of softening. Inspiration —30 millimetres, expiration 50 millimetres.

Mrs. D., aged twenty-seven years. Phthisis. Softening; hæmorrhages. Inspiration —14 millimetres, expiration, 20 millimetres.

J. L. S., aged thirty-five years. Advanced phthisis. Inspiration —10, expiration 20, which changed to 16 in less than two weeks.

Mrs. W., aged thirty-eight years. Advanced phthisis. Inspiration —8 millimetres, expiration 12 millimetres.

5. *Pneumonia.*—In pneumonia the inspiratory pressure is reduced, and when the inflammation is extensive the expiratory also, but the latter remains always greater than the former. I have had no opportunity myself to test the respiratory power in pneumonia, and therefore cite the following three cases published by Eichhorst: [1]

Case I.—Laboring-woman, aged fifty-nine years. Croupous pleuro-pneumonia of the left inferior lobe. Inspiratory power —25 millimetres; expiratory 36 millimetres. On the day before the crisis, inspiratory power —31 millimetres; expiratory 32 millimetres. Eleven days after the crisis, inspiratory power —40 millimetres; expiratory 44 millimetres. Fifteen days after the crisis, inspiratory power —60 millimetres; expiratory, 63 millimetres.

Case II.—Laborer, aged forty-three years. Croupous pleuro-pneumonia of the left lower lobe. Inspiratory power —23 millimetres; expiratory power 37 millimetres. Six days after the crisis, inspiratory power —50 millimetres; expiratory power 54 millimetres.

Case III.—Laborer, aged twenty-seven years. Croupous pleuro-pneumonia of the left lower lobe. Inspiratory power —22 millimetres; expiratory power 24 millimetres. In the further course of the disease, inspiratory power —13 millimetres; expiratory power 14 millimetres. Day of the crisis, inspiratory power —36 millimetres; expiratory power 38 millimetres. Three days after the crisis, inspiratory power —43 millimetres; expiratory power 46 millimetres.

6. *Pleurisy.*—Here, similar pneumatometrical conditions obtain as in pneumonia and pulmonary phthisis. Aside from the pain which tends to prevent deep inspiration, and therefore may reduce to a minimum the inspiratory pressure and correspondingly also the expiratory, it is obvious that compressed or inflamed consolidated tissue, or effusion, or pleural adhesion, must considerably interfere with inspiration, even when there is no pain. In all cases of pleurisy the pneumatometer registers insufficiency of inspiration: in mild cases the expiration may appear nearly normal; in severe cases there is insufficiency of both expiration and inspiration, the positive

[1] *Op. cit.*, p. 278.

pressure of the former almost always exceeding, however, the negative pressure of the latter. As an example, I may mention, from my own observation, the case of M. R., aged thirty-nine years. Has had pleurisy repeatedly in his life, "caught a bad cold a few days ago;" dullness over middle and lower portions of left lung, with feeble respiratory murmur and friction-sounds. Inspiration —26 millimetres, expiration 34 millimetres.

Eichhorst reports, in the case of a laborer forty years old, with pleurisy of the lower portion of the right side, exactly the same figures, while he found three weeks later the inspiratory power to be —44 millimetres, the expiratory 50 millimetres.

Eichhorst also reports an interesting case of empyema in a boy fifteen years old, in which, after being twice punctured, the pleural cavity was opened with free incision, and cleansed daily by injection. Three months after the incision, inspiration measured —24 millimetres, expiration 29 millimetres. In the course of recovery these figures increased, and in six weeks became about normal, thus—

April 12, 1872.—Inspiration —24 millimetres, expiration 29 millimetres.

17*th.*—Inspiration —35 millimetres, expiration 45 millimetres.

20*th.*—Inspiration —37 millimetres, expiration 43 millimetres.

25*th.*—Inspiration —42 millimetres, expiration 78 millimetres.

May 22*d.*—Inspiration —60 millimetres, expiration 84 millimetres.

7. *Narrowing of the Upper Air-Passages.*—The largest number of pneumatometrical observations which I have made concern cases of laryngeal, tracheal, and pharyngo-nasal disease. I shall not here specify the individual affections, but will merely remark that whenever swelling of the mucous membrane, neoplasm, obstructive accumulation of phlegm, presence of foreign body, paralysis of the vocal bands, or constriction or compression from the outside, interferes with the normal admission of air, the pneumatometer immediately in

dicates the inspiratory insufficiency: the expiratory pressure may be normal, or even increased, or else diminished, according to the circumstances of the case. I shall relate no cases in this connection, for I would hardly know where to begin and still less where to stop.—In pharyngo-nasal catarrh, the difference of the pneumatometrical figures obtained by breathing through my nose-piece and the mask (breathing through the open mouth) is a significant measure of the insufficiency of per-nasal inspiratory power.

II. **Diseases of the Circulatory Organs.**—In fatty degeneration of the heart both inspiration and expiration are considerably reduced; in hypertrophy and dilatation, especially inspiration is. In mitral disease and stenosis of the left auriculoventricular orifice, there is mainly insufficiency of expiration, while in disease of the aortic valves there is insufficiency of both expiration and inspiration, but particularly of the latter, as in the following case: R. C., aged forty-two years. Aortic obstruction and regurgitation; commencing mitral regurgitation; hypertrophy of the left ventricle. Inspiration —60 millimetres, expiration 80 millimetres.

III. **Abdominal Affections.**—All painful processes in the abdomen interfere with the power of respiration, especially that of expiration. Pregnancy, abdominal tumors, exudations, and adhesions, cause expiratory insufficiency; even if the inspiration be also reduced, it nevertheless in these cases usually exceeds, instead of being less than, the expiration.

1. Of *pregnancy*, Eichhorst has reported fourteen cases [1] of which I will cite the following three. All these women were, of course, free from disease of the chest:

Case I.—Servant-girl, twenty-eight years old, primipara, in the last month of pregnancy. Inspiration —65 millimetres, expiration 48 millimetres.

Case II.—Laboring-woman, thirty-nine years old, eight children previously, six months pregnant. Inspiration —6L millimetres, expiration 21 millimetres.

Case III.—Laboring-woman, twenty-six years old, one child previously, seven months pregnant. Inspiration —36 millimetres, expiration 11 millimetres.

[1] *Op. cit.*, p. 279.

2. Of *tumor*, I will cite two cases from Eichhorst, and a third from Waldenburg.[1]

Case I.—Widow, sixty-eight years old; very painful cancer of the liver occupying the greater part of the right side of the abdomen. Inspiration —26 millimetres, expiration 18 millimetres.

Case II.—Shoemaker, thirty years old. Cirrhosis of the liver in the first stage, with enlarged spleen. Intense icterus, at present no ascites. Inspiration —72 millimetres, expiration 40 millimetres.

Case III.—Pl., machinist, fifty-seven years old. Carcinoma of the liver, principally left lobe. Inspiration —120 millimetres, expiration 52 millimetres.

3. Of *exudation*, the following two cases are reported by Eichhorst:

Case I.—Laboring-woman, thirty-three years old. Painful peritonitic exudation in the left superior inguinal region, of traumatic origin. Inspiration —46 millimetres, expiration 17 millimetres. Thirteen days later, inspiration —23 millimetres, expiration 17 millimetres.

Case II.—Servant-girl, eighteen years old. Very painful extensive parametritic exudation.

April 28, 1872.—Inspiration —46 millimetres, expiration 17 millimetres.

May 5, 1872.—Inspiration —47 millimetres, expiration 20 millimetres.

23*d*.—Inspiration —29 millimetres, expiration 17 millimetres.

27*th*.—Inspiration —47 millimetres, expiration 34 millimetres.

4. Hutchinson claims that he has "frequently detected *hernia*" by his instrument for measuring the respiratory power. The case in point which he mentions is as follows:

Age, forty years; weight, ten stone four pounds; height, five feet six inches; pulse, while sitting, 86; number of respirations per minute, sitting, 16; circumference of chest, 34½ inches; mobility, 3 inches; vital capacity, 222 cubic inches;

[1] "Die pneumatische Behandlung," etc., *op. cit.*, p. 78.

power of inspiration, 0.50 in. = about 13 millimetres; power of expiration, 1.00 in. = 25 millimetres.[1]

IV. **Muscular Atrophy and Paralysis.**—"Atrophy of all the muscles of the body, of course, reduces the power of both inspiration and expiration. Atrophy limited to certain groups of muscles will influence that phase of respiration in which the atrophied muscles act. In progressive muscular atrophy, the inspiration will be principally affected, as usually the atrophy mainly concerns the muscles of the chest. If the atrophy extends to muscles concerned in expiration, this too will be influenced, till at length respiratory insufficiency becomes so great that life can no longer be sustained.

"An effect similar to that caused by atrophy of the muscles must be produced by paralysis within the range of the respiratory muscles. I had an opportunity to observe, and examine with the pneumatometer, a striking case of *bulbar paralysis (glosso-palato-labial paralysis) complicated with progressive atrophy of the muscles of the trunk and upper extremities.* Miss L., twenty-two years old, has had for about a year a gradually-increasing nasal speech, afterward growing more and more peculiar and unintelligible. The patient cannot entirely close the lips so as to whistle, blow out a light, etc. Expectoration also difficult. When she swallows, the food returns through the nose. Respiration becomes increasingly difficult; the trunk and upper extremities very weak; the patient cannot hold up the head. The velum-palati is completely paralyzed (the vocal bands act normally); the tongue is atrophied, trembles continually and does not obey the will; the cavity of the mouth and pharynx is covered with viscous saliva, the mucous membrane reddened. Pectoral muscles very much wasted, the left more than the right; fibrillar spasms. The trapezius and muscles of the trunk also emaciated, on the right side more than on the left. Both arms partially atrophied. The lower extremities appear normal." (Death ensued about six weeks later from insufficient respiration.) "Maximum power of inspiration —20 millimetres, of expiration 20 millimetres.

"When I made the patient perform suction through the

[1] *Op. cit.*, p. 245.

mouth-piece of the pneumatometer, instead of inspiration, she could with difficulty raise the mercury to 60 millimetres. But it must be stated that she could not close her lips so tightly around the mouth-piece as to exclude the air."[1]

V. **Rupture of the Membrana Tympani.**—As a *Curiosum* I will mention that Hutchinson has recorded the following case of rupture of the tympanic membrane: Age, twenty-nine years; weight, ten stone one pound; height, five feet seven inches; pulse, sitting, 64; number of respirations per minute, sitting, 21; circumference of chest, thirty-four inches; mobility, three and a quarter inches; vital capacity, two hundred and sixty cubic inches; power of inspiration, 0.50 in. = 13 millimetres; power of expiration, 1.30 in. = 33 millimetres. When this man *closed* his ears, his respiratory power was manifested as nearly three times as strong.[2]

VI. **Phosphorus-Poisoning and some other Morbid Conditions.**—With a view of learning what influence different diseases might have upon the elasticity of the lungs, Perls[3] experimented upon one hundred dead bodies by bringing the trachea into air-tight connection with a manometer, and measuring the pressure the lungs exerted by their contraction on opening the thorax. From similar experiments previously made by Donders, as well as his own, Perls estimated the elasticity of healthy lungs after expiration, i. e., from the cadaveric position of the thorax to complete collapse, to be the same as what Donders had concluded, viz., about 80 millimetres. In the body of a person who had died from diphtheritic cystitis, he found the pulmonary elasticity, tested in this way, very much reduced, although there was no disease of the lungs or pleura. He found the same thing in other cases with healthy lungs and pleura; thus, in a person dead from poisoning by phosphorus, the elastic pressure amounted to only 11 mm.; of five cases of ileo-typhus, it was in one as low as 5 mm., in two 12 mm., in one 25 mm., and in the other 36 mm. It would be very interesting if the investigations which these experiments sug-

[1] Waldenburg, "Die pneumatische Behandlung," etc., *op. cit.*, p. 79.

[2] *Op. cit.*, p. 245.

[3] "Ueber die Druckverhältnisse im Thorax bei verschiedenen Krankheiten," "Deutsches Archiv für klinische Medicin," Bd. vi., 1869, p. 1.

gest, would be followed up in living patients by means of the pneumatometer.

Conclusion.—"With pneumatometry, the case is the same as it is with the other methods of examination, especially percussion and auscultation; it does not directly point out the presence of a particular disease, but it reveals certain abnormal conditions which may be caused by various, accurately recognizable diseases, between which differential diagnosis has to decide."[1] By means of the pneumatometer, dyspnœa, difficulty of breathing, which could hitherto be denoted by indefinite expressions only, can be characterized with exactitude both qualitatively and quantitatively—the first by showing whether it is inspiratory or expiratory, or both combined, the latter by determining in figures its precise extent or degree. And not only can the difficulty of breathing be determined when it exists subjectively as well as objectively, but in the first beginnings of a respiratory insufficiency, before the patient himself is conscious of it, except perhaps upon very unusual exertion, before we can discover its existence by any other method of examination hitherto known, the pneumatometer may indicate a deviation from healthy respiration. Again, in obscure cases of differential diagnosis, the weight of the evidence supplied by the pneumatometer may turn the scale in the right direction, when this might not be discernible without its revelation. The importance and value of pneumatometry can, therefore, not be doubted, and, without allowing it to take the place of other means of diagnosis, to it should unhesitatingly be awarded a prominent place alongside of the recognized and not-to-be-omitted methods of physical examination.

ART. III.—*Strapping the Breasts to prevent and arrest Lactation.* By W. W. MUNSON, M. D., Otisco, N. Y.

As strapping the breasts to prevent lactation seems to be considered a matter of some importance by Dr. Peaslee, as stated in his remarks before the New York Academy of Medicine, presenting Surgeon Wilson's "suggestion," reported in

[1] Waldenburg, "Die pneumatische Behandlung," etc., p. 63.

the New York Medical Journal, August, 1875, I would say that I have used this means ever since I have been in practice —four years—in a large number of cases, not only to *prevent* lactation, but to *arrest* it after the flow has commenced, where it has been desirable to dry up the milk, after death of the child, or for ulcerated, retracted, or imperfectly-developed nipples.

A failure has not occurred in a single instance, even in those very large breasts where an abundant flow of milk had been going on for several weeks.

Within the last month I applied the plaster to the breasts of a young woman whose babe was three weeks old. The nipples were retracted and could not be so drawn out by the usual means that the child could nurse with any degree of comfort. On account of the pain and trouble of nursing, she refused to torment herself and babe by any further attempts. Straps removed on the fifth day. Secretion completely arrested, without pain or inconvenience of any kind.

I have no faith in ointments, liniments, salves, washes of belladonna or any thing else, applied externally to the breasts to dry up the milk. There is no sense or science in putting any thing on the skin of the breast with the expectation of affecting the secretion in the gland underneath, one way or the other.

I give the following as representative cases:

I.—Mrs. F., 1871. Nipples became fissured and ulcerated, as had been the case with her before. They could not be healed while nursing. I applied the strapping to both breasts over a thick layer of cotton-wadding, with the idea that the elasticity of the cotton under the plaster would increase the pressure; but I soon found that there is no elasticity in cotton. Have never used it since. In this case the milk oozed from the nipples for a day or two, saturating the cotton and making a poultice of it. This is another reason for not using it. The case did well, although the strapping had to be removed from one breast, and renewed after emptying the gland, on account of pain.

II.—Mrs. R. I will give my notes of this case just as I find them written in 1873:

"*August 8th.*—Delivered of her eleventh child on the 5th inst. Nipple of left breast destroyed by ulceration while nursing first two children. No milk has been got out of it for several years; but it has always filled, 'caked,' and inflamed. Been lanced for abscess many times. Find breast immensely distended and painful to-day. Strap it snugly with adhesive plaster in every direction—completely inclosing the gland in a firm case. This gives it good support, steady pressure, and keeps all the old women's nostrums off." I did not see her again till August 13th, when I wrote: "States that she had considerable pain for two days after strapping, but to-day the secretion is all gone, and breast reduced to nearly its natural size. A perfect success."

There would certainly have been an immense abscess in this breast without the strapping.

III.—Mrs. L. This case occurred last January. Nothing unusual about it. Tenth child, still-born. Neglected to strap breasts next day as I should have done. Milk began to flow very abundantly on the third day. Strap them in the usual manner. Had no trouble whatever with them. Found breasts empty, flabby, and secretion completely arrested on third day after strapping.

Strapping will be of no use unless it is well done. Let the first strip be put on so as to hold the breast well up by itself alone, whichever direction it is made to take. I usually commence by placing a strip laterally beneath the breast, about half-way between the nipple and lower margin, draw the gland well up, and attach one end high up on the sternum and the other end high up under the arm. The next strip is placed at right angles to the first, close to the nipple. Apply to breast first, draw it well up and fasten upper end, letting it pass over the shoulder, then draw down lower end firmly and fasten it. Don't skip the nipple or cover it, but cut holes through the strips that pass over it, and let it project through. This is to allow the milk which may ooze out for the first few hours to escape, without burrowing beneath the plaster, pushing it off, and making a hot, disagreeable, irritating poultice. Several thicknesses of soft cloth should be placed over the nipple

(when pervious), to absorb the milk that escapes. This should be renewed as often as it becomes saturated.

A timely application of this plan of strapping I have found almost sure to arrest commencing mammary abscess.

Original Lectures.

Clinical Lecture on Diseases of Women. By Prof. T. Gaillard Thomas, M. D., delivered in the College of Physicians and Surgeons, New York, October 8, 1875. Reported for the New York Medical Journal, by S. B. Jones, Jr., M. D.

The first patient who appears before us to-day, gentlemen, is Mrs. C. P., thirty-two years of age, born in Germany; has been married eleven years, and has had two children, the youngest of which is seven years old. Since the birth of this child she has never been pregnant, and dates her present illness from it.

She comes here to-day in search of relief for the following symptoms: pain in head, back, and limbs; a sense of fatigue and exhaustion, and a feeling of general debility; her menstrual periods are painful and irregular; she suffers from leucorrhœa, which is at times very profuse, constipation, and at times considerable irritability of the bladder. In spite of these symptoms, however, she tells us that she "drags around," and attends to her ordinary avocations.

Before proceeding to more important points, let me draw your attention to the perfectly simple and straightforward manner in which this woman tells her story. You will notice that there is a great difference in this respect among patients; some exaggerate their symptoms, others make as little of them as possible. This patient belongs to the latter class, and impresses me as one who underrates rather than overrates them. We have already heard enough to make us suspect that some abnormal condition exists in the pelvic organs as the source of Mrs. P.'s ill-health, and we at once proceed to an examination of them.

Physical Examination.—Always place the patient upon a table or other *hard* surface when you examine upon the back, otherwise the buttocks will sink down and render examination difficult; place the feet on a chair, or drawn up on the edge of the table; cover the table with a blanket and sheet; have at hand a basin of water and a piece of soap, rather than lard or oil; these are more difficult to obtain, are often rancid, leave a disagreeable odor on the fingers, and render the sense of touch less delicate than soap does, which is always at hand. Lubricate the left index-finger. Have the clothing about the patient's waist loose, so as not to press the uterus down into the pelvis.

Passing my finger into the vagina I examine the cervix. Instead of feeling the normal os, it passes up to the os internum, and I feel a large, roughened surface, covered over with granulations. At once I diagnosticate a condition which is commonly regarded as, or rather mistaken for, granular degeneration of the cervix, but what is in reality a laceration of this part, which occurred with the exit of the child's head from the uterus. Now, practising conjoined manipulation, I find that the uterus is large, heavy, and anteverted. Separating the labia majora, I discover further that all sphincteric action at the ostium vaginæ has been destroyed, that the perineal body has been rent in two, and that the vagina, large and flabby, has prolapsed, both as regards the anterior and posterior wall. Rectocele has not occurred as a result of the prolapse of the latter, but cystocele has followed that of the former.

Changing the position of the patient from the back to the side, I introduce the speculum, and the moment I lift the lax posterior wall, a red or raw-looking surface comes into view. Taking the probe, and bearing in mind the anteversion of the uterus, I pass it to the fundus, and find that the uterus measures three and three-quarter inches instead of two and a half inches.

Now, let me recapitulate for you the abnormal conditions existing in this case, and see how they account for the sterility of seven years' duration, the weakness, pain in head, back, and limbs, leucorrhœa, irregular and painful menstrua-

tion, and vesical trouble of which the patient complains: 1. We find the woman suffering from laceration of the cervix uteri; 2. From anteversion of a large, heavy uterus; 3. From rupture of the perinæum; and, 4. From prolapse of a large, lax, and enfeebled vagina. You will begin to think that I am opening before you a perfect Pandora's box, and yet not only is every condition which I have mentioned readily to be discovered, but the pathological combination which is here presented to you is one of very frequent occurrence. I need not tell you that it is sufficient to account for every symptom of which she complains; pain, disordered menstruation, derangement of the nervous system, and leucorrhœa.

Let us now proceed one step farther, and connect the present combination of abnormal conditions with the parturient act, which, occurring seven years ago, changed this woman from a strong, robust person to the suffering invalid of to-day. As the child's head passed through the cervix uteri, this part was lacerated on both sides, and at once the hitherto healthy woman was exposed to the great dangers of puerperal septicæmia. Upon asking her about her convalescence after delivery, she said she "was very bad" with "milk-fever" for seven days, and that her friends thought that she would not live; also, that during this time she had no milk. Now, what she calls "milk-fever" was really puerperal fever. After the birth of the child, the lochial discharge, the detritus from the uterine mucous membrane, pouring over these lacerated surfaces, was absorbed, and the septic material poisoned the system. This is very likely to occur, just as one of you may absorb septic material through a cut on the finger while dissecting. The uterus, after the child's birth, undergoes fatty degeneration, and by this process returns to its original size. But, in this case, owing to the ruptured cervix, this process was but partially performed, and instead of a womb which measures two and one-half inches there is one which measures three and three-quarters.

As the uterus increases by a species of physiological hypertrophy during utero-gestation, and undergoes involution after parturition, so does the vagina and so do the uterine ligaments. Were it otherwise, the child's body, being expelled

even before the full term, would inevitably lacerate the former, and every parturient act would be followed by uterine displacement from inefficiency in the latter. The rupture which has here occurred in the perinæum has prevented involution of the vagina, as cervical rupture has interfered with the same process in the uterus; and thus we have now to deal with a uterus larger than normal on account of sub-involution and tending to fall from its position, not only from its own increase of weight, but because it is dragged upon by an abnormally heavy, sub-involuted vagina, the lower portions of which fall out of the pelvis because rupture of the perinæum has destroyed the sphincteric action of the ostium vaginæ. As the bladder rests upon the anterior vaginal wall, prolapse of this has resulted in cystocele, which has helped to pull the fundus uteri forward and to establish anteversion. The prolapsed vagina is one reason why the patient is unable to walk without fatigue. The pain in the back is due to the displacement, and to the fact that the delicate lining membrane of the lacerated cervix is everted, and so exposed to friction in moving, during sexual intercourse, etc., that it causes pain, just as a man accustomed to wear shoes suffers pain when walking barefooted. This also causes some leucorrhœal discharge. The latter, however, is in great degree the result of uterine engorgement, consequent in part on the cervical laceration and in part due to displacement. This engorgement creates and perpetuates general nervous disturbance.

Now, gentlemen, this is a type of a large number of cases; they are very common, and I do not apologize for dwelling upon it. I expect to show you more of them this winter. You will not be able to cure them unless you find out where the trouble lies. This woman has probably been to eight or ten physicians. (To the patient)—"How many doctors have you seen during your illness?" "Nine or ten." And, like another patient we have read of, she "was nothing bettered, but rather grew worse." Let me tell you of the experience of many of the unfortunate women affected like our patient. The invalid calls on Dr. A. Dr. A. examines her and finds an "ulcer," which he treats for a long time with nitrate of silver, and gets something like a mucous membrane to form over it, and the

"ulcer" is almost cured, but the patient is not, and so she goes to Dr. B., who finds "displacement of the womb," which he replaces and keeps up with a support; Dr. C. in time finds the ruptured perinæum; Dr. D. later makes the diagnosis of prolapsed vagina; Dr. E. of cystocele, and so on through the number.

There is but one way in which success can be obtained in the treatment of these cases. He who hopes to cure them must view them from a broad, comprehensive, philosophical stand-point which enables him to grasp not one link in the morbid chain, but the continuation of evils which act and react upon each other.

In the instance before us, to what symptom must we first address our attention? How shall we treat this case? Let us begin with the congestion of the uterus. The return circulation is deranged by the malposition; the arteries carrying the blood more quickly than the veins can take it back, the organ is engorged; hence I should replace the womb in order to allow a free venous return, in the hope that the effect of that displacement, the congestion, would disappear after congestion had been lessened by this removal of one of its mechanical causes. Probably, in a fortnight or three weeks, I would etherize the patient, pare the edges of the cervical lacerations after Emmet's method, and sewing them together I should expect in eight days the "large ulcer of the cervix," which eight months of cauterization could not cure, to disappear entirely. The uterus under these two influences would rapidly become smaller, lighter, and less "irritable." Vesical irritation would diminish and vaginal circulation would become freer, because less impeded by pressure upon the veins at the upper part of the vagina. Now I should replace the annihilated perineal body. This would remove tendency to prolapse of the posterior wall, and, by firmly sustaining the anterior, remove that to cystocele.

By this time many of the symptoms from which this patient now suffers would be relieved, and all of them would be benefited. True, sub-involution of uterus and vagina would still exist, but, having removed the prolonged congestion which had existed in these parts, both conditions would be robbed of many of their evil consequences.

Notes of Hospital Practice.

MOUNT SINAI HOSPITAL.

Treatment of Acute and Chronic Rheumatism by Means of Hot Packing.—In a former number of this JOURNAL an account of the treatment in this hospital of acute rheumatism by means of cold packing was published. Since that time hot packing has been tried, and with excellent results. The method of procedure is as follows: The bed is prepared by spreading over it a sheet of rubber cloth, and over this a blanket. Hot blankets are then wrung out of water of a temperature about as hot as the hand can bear, and with these the patient is enveloped. Two or three thicknesses of dry blankets are superimposed, and the whole retained in position till the patient is free from pain—a time varying from two to six hours. When the pack is applied the patient sweats very profusely, as might be supposed, and after its removal no danger has been found to occur. If the pain is confined to one joint, that joint is enveloped by the hot blanket, which is removed as soon as the pain disappears. One case of chronic rheumatism, extending over a period of seven months, was treated by means of local packings, and after slight relapses, occurring at intervals for five weeks, was discharged perfectly cured. This method presents the advantage in private practice of not shocking the friends of the patient as much as the ice and ice-water packings.

Membranous Dysmenorrhœa.—A patient afflicted with this rare disease has been for some time in hospital. The history of the case is as follows: When she was fourteen years of age she began to menstruate. The flow of blood was accompanied by very severe expulsive pains, and she noticed that pieces of membrane made their appearance. At times the membrane had the appearance of a small bladder, due in all probability to the fact that it was a cast of the uterus. This condition of affairs remained unchanged till she entered the hospital, about a year ago. At that time the uterus was enlarged, sensitive, and slightly flexed. It was proposed to change the character

of the cavity of the uterus, with the hope of improving the disease, and for this purpose the os was dilated and the galvano-caustic was carried over the whole of the membrane. Shortly after this the patient left the hospital, but has returned recently. She said that, at the menstrual epoch following the cauterization, very little dysmenorrhœa was experienced, but that at the following periods she was as bad as she had been previously. The caustic has been again employed, but it is too soon to decide upon the effect. There can be no doubt that the case is true membranous dysmenorrhœa, inasmuch as several complete membranes have been obtained and preserved.

Diphtheria, Laryngotomy.—A case of diphtheria, with implication of the larynx, has been under treatment here. The dyspnœa was very marked, and laryngotomy was had recourse to. The patient improved very much after the operation, and looks now as if he might recover.

ROOSEVELT HOSPITAL.

Perityphlitic Abscess; Operation.—Dr. R. F. Weir operated on a case of abscess in the neighborhood of the cæcum, under the following circumstances: Some time ago the patient suffered from an attack of fever, but the history of the case fails to decide whether it was or was not typhoid. After recovering from the fever, he was attacked with diarrhœa, and about the same time noticed a tumor on the right side. This continued for three weeks, when he entered the hospital. On admission, a tumor about the size of an orange was found on the right iliac fossa, but at no time was the tumor larger than when he entered the hospital. The needle of the aspirator was carried into the tumor, and some pus removed. On the following day the aspirator-needle was again introduced, and with it, serving as a guide, a bistoury was carried down and the abscess freely opened.

Melanosis; Result.—In the report of the Roosevelt Hospital in the number of the New York Medical Journal for June, 1875, a case of melanosis is referred to. Since that time the

patient has died from exhaustion, and at the *post-mortem* all of the tissues were found to be stained with pigment. Melanotic tumors were found on the mesentery, and one small tumor was found on the surface of the brain; but, at the time of death, it was not of sufficient size to give rise to any cerebral symptoms.

CHARITY HOSPITAL.

School for Nurses.—There has been recently established, in connection with this hospital, a school for nurses, somewhat similar in arrangement to that at Bellevue Hospital. It differs, however, in the fact that here it is not a separate organization, but is under the charge of Dr. D. H. Kitchen, the Chief-of-staff. Lectures are delivered twice a week, on subjects connected with nursing, by the Chief-of-staff and different members of the Medical Board.

Hemiplegia; Use of Strychnia.—A patient, aged twenty-five, entered the hospital suffering from right hemiplegia. The history pointed to its gradual invasion, and the only cause which could be assigned was an injury of the head, received when he was a child. Strychnia in the following form was administered:

℞. Strychniæ, gr. j.
Acid. acetic., ʒ ss.
Tr. card. co., ʒ ss.
Spts. vin. rect., ℥ jss.
Aquæ, ℥ jss.
Syrup. simp. ad., ℥ jv.

Teaspoonful three times a day. Under this treatment the case is improving.

Hemiplegia; Use of Ergot.—This case of hemiplegia had a somewhat similar history to the previous one. On admission there was no loss of sensibility, but there was complete hemiplegia. Bromide of potassium was given in fifteen-grain doses, but no improvement of the paralysis took place. The fluid extract of ergot was then administered in half-drachm doses, and at the end of three weeks he was able to raise the leg slightly. By degrees the paralysis improved sufficiently to allow of him

to walk across the ward. The dose of the ergot was increased to one drachm three times a day, and at the present time he is nearly well.

The Earth-Treatment in Ulcers.—Dr. F. M. Trask has been employing the earth-treatment in chronic ulcers with marked benefit. The method of using it is to first bring the ulcer into proper condition by means of nitrate of silver, or other agents indicated. When the ulcer is thus prepared, twenty-five or thirty grafts are inserted, and the whole covered by clay, in the following manner: The dry clay is mixed up with olive-oil, to the consistence of a paste, and applied twice a day. The results obtained are highly satisfactory; more favorable, indeed, than by any of the other measures. The introduction of the method was due to Dr. Pallen.

BELLEVUE HOSPITAL, NEW YORK.

Jaborandi.—Dr. Janeway has been using jaborandi, but has not been able to get as satisfactory effects as have been reported by some observers. One drachm of the powder was given in the form of an infusion of four ounces, and at the end of a half-hour there was an increase of the temperature of $\frac{1}{2}°$, with slight tendency to diaphoresis. In the second case, one drachm was given mixed with water, and again no result followed, beyond an increase in the frequency of the pulse. In the third case, Dr. Knox, the house-physician, took one drachm mixed with water. In forty-five minutes marked salivation occurred, but no diaphoresis. These observations would go to show that some of the conditions favorable to diaphoresis were present, such as increase of temperature, and, if the patients were heavily covered with clothing, diaphoresis might result.

Apomorphia.—Apomorphia is an active emetic, in doses of from one-tenth to one-eighth of a grain, when administered hypodermically, the emesis coming on in one or two minutes; in one case it was delayed for fifteen minutes. The objection attending its use is, that it occasions a tendency to syncope.

The Use of Remedies upon the Mucous Membrane of the Tra-

chea.—Claude Bernard, in his recent work, has drawn attention to the fact that, contrary to what is generally supposed, agents can be introduced within the trachea without causing irritation. The advantages obtained in a therapeutic point of view are, that they are quickly absorbed, even when absorption is in abeyance in other parts of the system. Jousset records the introduction of five grains of quinine upon the mucous membrane of the trachea, in a case of congestive chill, where the patient was nearly moribund, and in this case the patient rallied. The quinine was given in solution. Dr. Janeway had a case of obstinate vomiting in a patient, in which collapse appeared two days later. She was admitted into the hospital, and hypodermics of brandy were given without avail. It was then determined to try their effect on the trachea, and for this purpose half a drachm of brandy mixed with half a drachm of water was introduced within the trachea, by means of the hypodermic syringe. No irritation resulted, but there was no improvement, and the patient died a few hours later. At the autopsy no sign of irritation was discovered on the bronchial mucous membrane.

The part of the larynx which is sensitive is that which is supplied by branches of the superior laryngeal nerve.

Correspondence.

Newark, N. J., *October* 5, 1875.

Editor New York Medical Journal:

Upon reading your review of Dr. Brackenridge's article on quinine as a local application in diphtheritic scarlatina and other forms of sore-throat, I am led to write you of a considerable experience with it in another form, and a remarkable success after failure of many other remedies. It is now eight years since a physician, who had been fifty years in practice, suggested for a patient of mine, suffering from ulcerative stomatitis, a mixture of Peruvian bark, acacia, and sugar, made into a paste with cream; its success then led me to use it in one case after another with the same result; and in scarlatina,

diphtheria, and all aphthous affections, it has proved invaluable.

The use of quinine as a topical remedy for hay-asthma revived the experience of its value; and I have reason to believe that the physician to whom I am indebted for its suggestion had used it for several years before Binz published his interesting experiments. The following is the formula alluded to:

℞. Corticis Peruvianæ flav., ʒ ij.
Acaciæ pulv., ʒ j.
Sacch. alb., ʒ ss. M.

S. Mix one-half of this powder in a table-spoonful of cream, and apply frequently with a camel's-hair brush.

EDGAR HOLDEN, M. D.

Proceedings of Societies.

BOSTON SOCIETY OF MEDICAL SCIENCES.

Report of Proceedings from April to May, 1875.

JAMES J. PUTNAM, M. D., *Secretary.*

Tuesday, April 27th.—Dr. WARREN showed some microscopic specimens of *round-cell sarcoma*, which, arising in the tissue beneath the skin of the back, had, at the time of its removal, begun to infiltrate through the superjacent cutis.

The skin over the most prominent part of the growth was thickened, and, on vertical section, showed beneath it the outline of the disease tolerably well defined, but from this point projecting upward to the surface were several slender, parallel columns, at equal distances from one another, and reaching the epidermis at points where the little dimples made by the openings of the hair-follicles were to be seen.

Topographical sections of the part, made by Dr. QUINCY, showed that in forming these columns the disease had followed the hair-follicles and sweat-ducts. The sweat-ducts could not be traced to the surface in these prolongations in all cases, but the hair-follicles were almost invariably found. More minute

examination of the intervening cutis showed the connective-tissue fibres at many points to be indiscriminately mingled with small round cells.

It was noticeable that the prolongations were vertical, and had but few, if any, horizontal branches.

The above observations upon the seat of these parts of the growth were confirmed by the appearances seen in horizontal sections.

The route which the disease had taken in trying to reach the surface suggested an invasion of the skin at its weakest points, where it was, from its anatomical structure, least prepared to resist pressure from below. The study of this specimen suggested also a possible explanation of the manner in which inflammatory products may find their way to the surface of the skin.

Dr. Warren spoke also of several instances, which had recently come to his knowledge, of the occurrence of *wens in unusual places*, viz.:

1. On the palmar surface of the little finger.
2. On the back of the wrist.
3. (Not certainly a wen) on the palm of the hand.

Dr. Bowditch showed a specimen of *water from an Artesian well*, which had been sunk in Causeway Street, for the use of the gas company. It had a bitter taste, and contained a good deal of solid matter in suspension. Its characteristic quality was, however, that it contained a good deal of *chloride of calcium* in solution, and, knowing this, it had occurred to Dr. Bowditch that it might be used to advantage for watering the city streets, on account of the tendency of that salt to retain and absorb moisture. He had as yet tried but a few preliminary experiments to test the value of the water for this purpose, with moderately satisfactory results.

Tuesday, May 25th.—Dr. Bowditch showed the *model of a new induction apparatus*, devised by himself. The most common method of regulating the intensity of the current, with the usual induction-machine, is to draw apart the two coils of wire, or the reverse, while their axes are kept in the same straight line. The well-known "sledge apparatus" of Du Bois-Reymond is constructed on this principle. By this

method very feeble currents can only be obtained by separating the coils to a considerable distance, and instruments made to allow of this have a length which is often inconvenient.

The model presented was intended to illustrate how this difficulty may be obviated; namely, by providing that the secondary coil, so soon as it has been withdrawn enough to be fairly free of the primary coil, can be rotated round its vertical axis. In this way the intensity of the induced current may be reduced, and, when the axes of the two coils are at right angles with each other, an absolute zero is obtained, which is impossible when the coils are simply drawn apart with their axes in the same straight line. The effect of simple rotation of the secondary coil, regarded by itself, would doubtless be to cause the intensity of the induced current from that coil to vary in the same proportion with the cosine of the angle of rotation. This effect is, however, complicated, in fact, by the variation in the distance of the different parts of the two coils from each other which attends the rotation of one coil. It is accordingly found that the curve which represents the actual variations in intensity produced in the way described—obtained by measuring with the galvanometer the intensity of single induction-shocks after each rotation through ten degrees—differs considerably from the curve of the cosines.

An apparatus of this sort would, therefore, like the ordinary instrument, require an empirical graduation.

Dr. Warren showed a specimen of *callus* on a rabbit's leg, of fourteen days' growth, and called attention to the fact that it illustrated the statement that had been made, that the periosteum was not the only agent for the production of the callus, but that the other soft parts were active in the same direction.

Another specimen showed the repair which had taken place fourteen days after *section of the tendo-Achillis*. Here the new tissue had been developed from the sheath of the tendon.

Dr. Putnam spoke of a *case of loss of sensibility* to impressions usually causing pain, and, to a great extent, to changes of temperature, with preservation of the sense of touch, affecting almost the entire cutaneous distribution of the cervical and brachial plexus, and of some of the inter-

costal nerves, all upon the left side, coming on in a young and otherwise healthy man, after an attack of typhoid fever. The case will be more fully reported elsewhere.

MEDICAL LIBRARY AND JOURNAL ASSOCIATION.

Stated Meeting, October 8, 1875.

Dr. E. R. Peaslee, President.

On the Transmission of Syphilis from Child to Nurse. By Dr. R. W. Taylor.—Dr. Taylor read an important paper on the subject of contamination of the nurse by an infected child, and made the history of one case that came under his observation serve as a text for the principal part of his remarks. The history of the case was briefly as follows: A woman was confined at a lying-in asylum in this city, and after delivery the care of several infants was intrusted to her. She herself was a primipara, and was delivered of a healthy child. Among the nurslings that were put to her breast were two who had constitutional syphilis, as the after-history proved. The woman took these children to nurse under protest, and adopted the wise precaution of retaining one of her breasts for her own child, allowing each of the other children to nurse at the other breast. After a few weeks she detected a sore on the nipple of the breast which had nourished the infected children; and this sore, on careful examination, showed itself to be a true chancre. This latter fact was still further proved by constitutional symptoms following.

The really important bearing of the paper was in regard to prophylaxis in other cases, and Dr. Taylor suggested that, inasmuch as seventy per cent. of syphilitic children have buccal lesions, it is important that the physician examine closely suspected children before exposing the nurse to the danger of contracting syphilis.

[The main obstacle that presents itself is the diagnosis of specific ulceration of the mouth from the non-syphilitic; and we are of the opinion that this is more difficult than Dr. Taylor would lead us to believe.

In institutions where large numbers of children are cared for, it becomes an exceedingly difficult subject to distinguish the diverse forms of stomatitis in the non-syphilitic child from the buccal manifestations in syphilitic children. Again, children suffering from inanition have, to a certain extent, the dried-up appearance of those infected with syphilis, and coryza or the snuffles is common to all children. The eruption must be considered as the determining symptom, and in default of that a child otherwise affected can only be looked on with suspicion, varying in degree with the number and prominence of decided syphilitic symptoms. We agree, however, with Dr. Taylor in the propriety of watching closely all suspected children, and not allowing them to be taken to the breast of a non-syphilitic woman. Dr. Taylor based his remarks on one case; but we have had occasion to investigate the subject in a large institution in this city, and found only one well-marked case where the woman contracted syphilis from the child. There were other cases of syphilitic women nursing syphilitic children, but there was the grave suspicion that they contracted it before the birth of their own child. Dr. Taylor said that a true chancre on the nipple was liable to begin as a pimple or a small fissure, and extend. J. J. R.]

Exhibition of a Vaginal Douche.—Dr. F. P. Foster exhibited a vaginal douche which was intended to prevent the wetting of the linen of the patient during the administration of the douche. The instrument consisted of one tube to convey the water to the vagina, and another to carry it away, with a plug which closed tightly the orifice of the vagina.

MEDICAL SOCIETY OF THE COUNTY OF NEW YORK.

Stated Meeting, September 27, 1875.

Dr. Thomas Addis Emmet in the chair.

Post-Nasal Catarrh. By Dr. Beverly Robinson.—After the nomination of officers, Dr. Robinson read a complete and valuable paper on post-nasal catarrh, giving a summary of his

investigations in this disease. He said the disease was follicular, and situated in the nasal and naso-pharyngeal cavities. The two symptoms which were usually complained of by patients were a sense of stuffiness in the posterior part of the nose, and a continuous discharge of mucus posteriorly into the pharynx. The mucus may become hardened, and adhere to the mucous membrane, giving rise to inflammation and ulceration, and when this occurred the discharge became fetid in character.

Dr. Robinson said that, unfortunately, no method of treatment, so far pursued or advised, had been curative in every case, and this resulted in great part from the fact that it was impossible to apply remedies to every portion of the diseased membrane. The results of his observation were to the effect that constitutional treatment proved a most important element in the case. If the patient was anæmic, iron, quinine, and cod-liver oil proved of decided advantage; and if there was malaria present, it had to be combated by a sufficient amount of quinine. Of the agents which have a local effect on the naso-pharyngeal and pharyngeal mucous membranes, he had experimented with balsam-copaiba, cubebs, guaiacum, ammoniacum, and sulphur, and was led to the conclusion that the three most important were cubebs, sulphur, and copaiba, and of these he was in favor of cubebs. At first he had used the oleo-resin of cubebs, but found that it did not possess the virtues of cubebs itself. A form that had proved satisfactory was: cubebs, two ounces; sirup of orange, three ounces; mint-water, eight ounces—and of this half a drachm was to be administered every three or four hours. It was necessary to continue the cubebs for one or two months, and by its use the sensation of stuffiness in the head and hawking mucus may be relieved.

Diarrhœa or an herpetic eruption may appear during the use of the cubebs, and, if so, it is judicious to interrupt its administration for a few days.

In cases of syphilis, Dr. Robinson doubts the value of the iodide of potassium, and prefers to rely on mercurials. In respect to the local treatment, by means of applications, all of the advertised specifics had been made trial of, but without

advantage, and so far no agent had been brought forward which was satisfactory in its results. One important reason for this was, as has been already suggested, that they did not reach the whole of the diseased surface. Injections were dangerous, as had been pointed out by Dr. St. John Roosa, from occasionally causing otitis. The use of spray offered advantages in this respect, not only from being free from the dangers of injections, but also from the fact that, being in an atomized state, they more readily reached the whole site of the diseased surface. The main benefit to be derived, however, from any of the local agents, was to soften the mucus, and accelerate its removal. Dr. Robinson mentioned also, that he had used the inhalation of vapors, such as iodine, in some cases with apparent advantage, and had also practised the insufflation of powders. He presented an instrument by which the medicated powder could be blown through the nares with great facility.

Dr. Bulkley mentioned the fact that he found in his own person that derangement of the digestive organs was usually accompanied by an attack of post-nasal catarrh.

Dr. Burrall said that he had used with benefit an injection of salt-water. He had made some observations with belladonna, but had not, so far, arrived at any positive results. He was led to use belladonna from its peculiar effect on the throat. He thought that Dr. Robinson's paper must be considered as a valuable contribution to the literature of the subject of post-nasal catarrh.

Adjourned Meeting, October 12, 1875.

Dr. Thomas Addis Emmet, Vice-President, in the chair.

The Genesis of an Epidemic Puerperal Fever.—Dr. W. T. Lusk read a lengthy paper on the above subject, giving the history of the last epidemic of puerperal fever which took place within the walls of Bellevue Hospital. A special point of interest connected with the epidemic was the fact that, as it progressed, it was characterized by a diphtheritic membrane,

occurring on the genitalia of patients who had received laceration of the perinæum or the fourchette. While this was occurring at Bellevue, an epidemic presenting similar features occurred at the Philadelphia Hospital, and since that time there had been observed at Strasburg cases of puerperal fever complicated with this element of diphtheria. The diphtheritic deposit had been closely examined by Dr. Steurer, of this city, and Prof. Recklinghausen, of Strasburg, and the conclusions arrived at were that it was truly diphtheritic—micrococci were found beneath the deposit and scattered throughout the tissues of the uterus, whence they were taken up by the sinuses and conveyed into the circulation. They occur in colonies, and have been found in the blood-vessels of the kidney. Dr. Lusk said that he obtained decided benefit by applying Churchill's tincture of iodine to the membrane. During June, 1874, the obstetrical service which had proved so unfortunate was transferred to Charity Hospital at Blackwell's Island, and three months after the infected wards had been emptied they were occupied by the surgical service of Dr. James R. Wood, and during the past year many cases of capital operations have been cared for in them, and in no instance has there been septicæmia or pyæmia.

Dr. Cock, in response to a call from the chair, said that the paper of Dr. Lusk presented a fearful record, and a grave responsibility rested with those who retained the obstetrical service in Bellevue. He said that he was an assistant physician in Bellevue Hospital in 1840, when the first epidemic of puerperal fever broke out. The grand-jury, at that time, took the matter in hand, and closed the obstetric wards, but ten years later another epidemic appeared.

Dr. Gillette gave an interesting history of the cases that were transferred from Dr. Lusk's wards in Bellevue to his service at Charity Hospital. He said the waiting women were received at Blackwell's Island on June 11, 1874, and located in pavilions. The first patient that was delivered suffered from puerperal fever, but recovered. The second patient had also a mild attack of the fever. Both patients were delivered within forty-eight hours. It then became obvious that the patients had carried with them the fever-poison, inasmuch as

the obstetric patients in the lying-in wards proper of Charity Hospital were entirely free from the disease. In order to eradicate all traces of the poison, the clothing of the patients was taken away, a thorough bathing practised, and new clothing furnished. Quinine was also administered internally. After this precaution, no other cases of fever occurred, but a noticeable feature in the clinical history of the cases was, that the majority of the patients had elevated pulses, and temperatures showing that they had not entirely recovered from the fever-poison which they had absorbed in the wards of Bellevue Hospital. Dr. Gillette said that the practice in Charity Hospital was to remove fever patients as soon as the disease appeared, and at the same time the physician and nurse who had been in attendance on them accompanied them, and did not see any of the other patients.

Drs. Fordyce Barker, Isaac E. Taylor, and Mary Putnam-Jacobi, made some remarks.

NEW YORK ACADEMY OF MEDICINE.

Stated Meeting, September 16, 1875.

Dr. S. S. Purple, President.

The President welcomed the members to the Academy after the summer recess. He pointed out, in a few words, the lines of investigation which were specially indicated at the present time, such as the causes of the recent spread and present continuance of small-pox, the treatment and etiology of continued fevers, etc. The Librarian announced the receipt of numerous volumes for the library; among others, one thousand volumes of periodicals from the President.

What is the Best Treatment in Contracted Pelvis? By Dr. Isaac E. Taylor. *Placental Hæmatocele.*—Dr. Taylor, before reading the paper of the evening, presented a case of placental hæmatocele, in which the hæmorrhage took place between the chorion and amnion. The case came under his observation that morning, and was of special interest from its rarity. The patient had a convulsion, and was delivered by forceps. An-

other point of interest in the case was the presence of a thrombus in the right labium.

Treatment of Contracted Pelvis.—Dr. Taylor said that, in the consideration of the treatment of contracted pelvis, he would divide the subject into two parts: First, that in which the contraction was from two and a half to four inches; and, secondly, that in which the contraction was from two and a half to one and a half inch. He proposed to consider only the first class of cases for the present occasion; and, in their treatment thought that craniotomy was not indicated for the delivery of the patient in the great majority of cases, but that the choice rested between the forceps and version.

Dr. Taylor presented two deformed pelves, one of which was known as the uniformly contracted pelvis, and the other as the flat pelvis.

He presented also a fœtal head delivered by the forceps, in which the indentation caused by the promontory of the sacrum was nearly an inch in depth. The notes of two cases were read. In one the pelvis was of the simple flat form, and not rickety. The patient was aged twenty-three, and an inmate of Bellevue Hospital. She was delivered in thirty minutes by means of version. The second case was one of uniformly contracted pelvis, in which the antero-posterior measurement of the brim was three and three-quarters inches. In this latter case the cervix was only slightly dilated; and, contrary to the opinion of the majority, Dr. Taylor introduced the forceps within the undilated os uteri, and delivered the head of the child with considerable effort. The forceps that he used were after the model of Ritgen, but they had an extremely narrow blade, measuring not over two inches in width.

If the forceps proved unavailing to apply the requisite force, the woman might be safely delivered by means of version.

Dr. Taylor said that he was of the opinion that induced labor at the seventh or eighth month in cases of contracted pelvis was in many occasions indicated for the welfare both of mother and child.

On motion, the discussion was postponed till the next stated meeting.

This fall the library of the Academy has been opened to

the Fellows, and, although not as extensive as might be wished for, presents a large collection of periodical literature. It is situated on the second floor of the building.

The Academy has added a new feature to its meetings by having at the close of the proceedings a *conversazione*, somewhat after the method adopted by the Medical Library and Journal Association.

Stated Meeting, October 7, 1875.

Dr. S. S. Purple, President.

The President called attention to the death of two resident Fellows, Dr. Ernst Krackowizer and Dr. Cyrus Weeks. He appointed Dr. Jacobi to read a memoir on Dr. Krackowizer, and Dr. Finnel to read one on Dr. Weeks.

Dr. John Erich Erichsen was chosen a Corresponding Fellow.

Dr. Isaac E. Taylor recapitulated the leading points in the paper read before the last meeting, and took occasion to say that he did not agree with Dr. Goodell, of Philadelphia, who maintained that the neck of a fœtus would stand a tractile force of 150 pounds before it would separate from the head. In Dr. Taylor's hands several cases suffered decapitation, leaving the head in the uterus when a force not equivalent to 150 pounds had been exerted. He was of the opinion, also, that the lateral diameter of the fœtal head could be reduced one half-inch by the use of the forceps, and no special danger ensue. He thought also, in a similar manner, that the antero-posterior diameter could be reduced seven-eighths of an inch with safety.

Dr. E. R. Peaslee was of the opinion that Dr. Taylor's position could not be controverted. The subject was one of the most difficult to understand in the whole range of obstetrics, and one in which there was the greatest diversity of opinion.

Dr. Hanks related a case which bore on the subject under discussion. He was called to see a patient in January, 1869, in which labor had been in progress for six hours before his

arrival. He waited for four hours, and no additional advance was made, though the vortex had entered the superior strait. He found the patient to have a flat pelvis, and by the aid of the forceps delivered the woman, after two hours, of a still-born child. The patient in a few months again became pregnant, and at the end of the eighth month induced labor delivered a still-born child by means of version. The patient again became pregnant, and at the end of the eighth month he again induced labor, but proposed to use the forceps, believing it would be productive of better results. On that occasion a child was delivered which lived for a few days and died of inanition. The patient again became pregnant, but passed into other hands. She was delivered of a still-born child, and in a few days after died of broncho-pneumonia.

Pneumatometry in Disease.—Dr. Louis Elsberg read a paper on this subject, which will be found in full elsewhere in this journal.

Dr. John C. Dalton presented the following series of resolutions in regard to the late Dr. Foster Swift, a former member of the Academy. On motion, a copy of them was authorized to be sent to the family of the deceased, and on further motion copies were authorized to be sent to the medical journals:

Whereas, The members of the Academy have learned with regret of the death of their former associate, Dr. Foster Swift: therefore—

Resolved, That in Dr. Swift the Academy and the profession have lost a member whose personal character commanded the esteem of all those who knew him, whose brilliant talents gave sure promise of future distinction, and who was eminently fitted by his superior attainments, his singleness of purpose, and his engaging manner, for a prolonged life of usefulness and success. Also—

Resolved, That a certified copy of these resolutions be transmitted to the family of Dr. Swift as an assurance of the sympathy of the Academy in his loss, and of their high appreciation of his personal and professional qualities.

Dr. Dalton gave an interesting sketch of the life of Dr. Swift while suffering from his disease—phthisis. He first went to Mentone, France, and proposed establishing himself there, but found that he could not live away from his friends. He then retired into the interior of this State, and interested

himself in the studies of his boyhood's days, particularly the classics. During last winter he went to Santa Cruz, to visit some of his friends living there, and on May 10th he died.

NEW YORK PATHOLOGICAL SOCIETY.

Stated Meeting, September 22, 1875.

Dr. Francis Delafield, President.

Diaphragmatic Hernia; Death.—Dr. Drake presented a specimen of diaphragmatic hernia which had continued for two years, and, at the end of that time, ulceration and perforation of the gut took place, causing fatal peritonitis. The history of the case was as follows: A mason, aged forty-two, while engaged in the Fourth Avenue tunnel, received a stroke on his head from a descending stone-bucket. The shock was sufficient to flex his knees upon his body. He was taken to the Reception Hospital, on Ninetieth Street, where he remained for four months, and, at the end of that time, was able to leave the hospital and engage in work of a light character. Occasionally he vomited blood freely, and complained of pain situated on the left side. On August 24th the pains became of a griping character, and were attended with constipation and tympanites. He entered Charity Hospital August 27th, nearly two years after the injury, and it was then found that there was tympanites, but no tenderness at any point. The pulse and temperature were normal. On August 31st pain appeared in the left hypochondrium, accompanied by nausea and vomiting, and from this point it extended over the abdomen. On September 2d he died.

Autopsy.—The intestines were matted together with fibrine. The abdominal cavity was filled with fæces, and, in the left side of the diaphragm, a mass of omentum and intestines protruded into the cavity of the pleura. In the pleura was found about four ounces of fluid. On examining the gut it was found to be ulcerated and perforated near where it was engorged in the diaphragm, and, from the history of the case, it was evident that the attack of peritonitis was caused by this ulceration and perforation of the intestine.

Ovarian Tumor.—Dr. Sell presented two specimens of ovarian fluid, which he had removed by tapping. The first specimen was dark-colored, in consequence of hæmorrhage into the cyst. The second specimen came from another patient, and was of a gray color, due to the formation of pus within the sac. The first case was only temporarily relieved, but the second case shows signs of being permanently benefited.

Congenital Sarcoma of Arm.—Dr. Post presented the arm of a child, which he had amputated under the following circumstances: At birth a fungous mass was found at the lower part of the forearm. This was found to bleed very freely, and, after failing to remove it, amputation of the forearm was found necessary. The amputation was performed when the child was thirty-two days old. An examination of the growth by the microscope showed it to be sarcomatous in structure. Dr. Delafield said that some cases similar to the one presented were recorded in the last volume of "Guy's Hospital Reports."

Caries of the Vertebræ; Atrophy of the Cord.—Dr. Gibney presented the portion of a spinal cord and several carious vertebræ, with the following history: A boy, aged sixteen, entered the Hospital for the Ruptured and Crippled suffering from caries of the dorsal vertebræ. During the past eighteen months there has been paraplegia, and for the past four months kyphosis of the middle dorsal vertebræ. Latterly the sphincters have been involved in the paralysis, and eventually pneumonia occurred, and the patient died. At the autopsy the dorsal vertebræ were arched, the arch extending from the second to the twelfth vertebræ. The middle of the arch was found to exist at the sixth, seventh, and eighth vertebræ, and, in front of this there was a sac containing a curdy material, which proved to be inspissated pus. Pressure was made on the cord by the eighth vertebræ, and in this manner the paralysis could be accounted for. An examination of the cord showed it to be atrophied for a distance of two inches at the place corresponding to the deepest part of the arch. The atrophied portion showed no trace of blood-vessels, but immediately above it these were very distinct.

Stated Meeting, October 13, 1875.

Dr. Francis Delafield, President.

Necrosis of Bone without Involucrum.—Dr. Erskine Mason presented a specimen of necrosed bone, and also the patient from whom the bone was removed. The history of the case was of special interest, not only from its rarity, but also from the very valuable result which was obtained. The history was as follows: A boy, aged six years, entered Bellevue Hospital, November 9, 1874, suffering from an injury in the vicinity of the knee. The history was not satisfactory, but the facts obtained went to show that he fell down some steps and struck on his knee. When he entered the hospital ward he complained of severe pain; the knee was flexed on the thigh, and the thigh on the abdomen. The temperature was 103°. During the first five days he had delirium and insomnia, and, although there was no swelling of the knee, the patient experienced great pain when it was touched. After careful examination, no signs of fracture could be obtained. After some days the thigh began to swell, and on November 23d fluctuation was discovered over the inner condyle. The abscess, when evacuated, was found to contain six ounces of pus. Shortly afterward synovitis developed, and extension was applied to the limb. Fluctuation was detected near Poupart's ligament, and, after opening the abscess, a seton of oakum was introduced. For several months he improved pretty steadily, but at times would suffer a relapse. On February 18th a fracture was detected at the junction of the upper and middle thirds of the thigh, and at the time it was supposed to be a fracture of the involucrum. It was determined to remove the necrosed bone by cutting through the supposed involucrum, and on April 3d an incision was made through the soft parts, and, to the great surprise of Dr. Mason and the other surgeons, no sign of an involucrum could be detected, but instead a piece of necrosed femur, five and a half inches in length, which was detached at either end. This fragment consisted of the whole thickness of the femur, and rested in thickened periosteum. The dead bone was removed, and the limb put up immediately in

plaster-of-Paris dressing. The wound closed on May 28th, and at the present time there is perfect motion in the hip and knee joints. There is a shortening of the limb to the extent of an inch and an eighth, but in other respects the limb is perfect. Dr. Mason said he considered the case to be one of osteo-myelitis, with periostitis occurring secondarily.

Tumor of Neck; Sudden Death.—Dr. Beverly Robinson presented a tumor of the neck of the class that has been described by Virchow as *struma gelatinosa vasculosa.* The history was as follows: The patient was aged sixteen, and first noticed an enlargement in her neck. Some months previously, when she was seen by Dr. Robinson, the tumor extended from the sternum to the upper border of the thyroid gland, and was divisible into two lobes. It was of uniform density, and apparently an hypertrophy of the thyroid gland. On auscultation, a wheezing murmur was heard over the whole extent of it. The patient complained of a dry, ringing cough, accompanied with dyspnœa on exertion. It was proposed to try the effect of electrolysis on the growth, and for this purpose a needle was inserted into the middle of it, and a Drescher's battery of twelve cells employed. This was continued at intervals of two or three days, and resulted in a decrease in size of the growth. Some months after this Dr. Robinson was suddenly called to see her, and found that the tumor had enlarged very much, and that she was suffering from asphyxia. In less than an hour she died. It was found that, as the heart ceased to contract, the tumor decreased perceptibly in size. At the autopsy the tumor was found engorged with blood, and on incision a considerable quantity escaped. The growth extended from the top of the thyroid cartilage down to the sternum. The trachea was involved, and to a certain extent compressed by it. In answer to a question from the President, Dr. Robinson said there was no sign of œdema of the glottis.

Ossification of the Muscles.—Dr. Gibney presented a girl, with ossification of the muscles. She was aged ten. Last fall she had an attack of diphtheria, and some months later her mother noticed that she stooped forward and could not maintain herself in an erect position. Some time after this

a hard tumor appeared on her back below the scapula. When Dr. Gibney presented her to the Society, the latissimus dorsi showed signs of ossification. The erector spinæ and scaleni were also involved. The hard tumor found near the scapula was evidently an ossified muscle. The case is of great interest from its rarity, and also from the fact that it shows a tendency to the progressive form.

Dr. Janeway said that it was the first case of the kind that he had seen, and suggested the breaking up of the latissimus dorsi.

Dr. Knapp said that he met a similar case in Heidelberg.

Dr. Heitzman suggested the use of lactic acid internally to act as a solvent on the earthy matter.

Fatty Tumor.—Dr. Post presented a large specimen of fatty tumor which he had removed from a patient.

Lymph-Adenoma.—Dr. Janeway presented specimens of a liver which showed numerous lymph-adenomatous tumors. The history of the case was only remarkable for the extreme anæmia of the patient. He was a man aged thirty-six, who had no history of syphilis. He entered Bellevue Hospital, August 28, 1875, suffering from chilly sensations, accompanied by sweating. The lungs and heart were normal. Quinine was given to him, but no improvement took place. The spleen was slightly enlarged, but the liver was found to extend over to the umbilicus. On October 3d, severe pain, of a colicky nature, was complained of in the epigastrium, and on October 10th he died from syncope induced by the severe paroxysm of pain.

Autopsy.—The liver was enlarged, and there were scattered through it small granules, presenting the histological characteristics of lymph-adenoma. The surface of the liver was perfectly smooth. The spleen was enlarged and softened. The mesenteric glands were not enlarged. The marrow of the femur was gone, and in its stead there was a red substance consisting of blood-globules, and a deposit similar to that found in the liver. The kidney also contained this lymph-adenomatous material. Dr. Janeway said that the marked anæmia of the patient during life gave rise to the suspicion of leucocythæmia, but, on examination, it was proved not to be correct.

The appearance of the liver would be liable to lead one to the view that cancer existed, but there was no enlargement of the glands in the proximity.

Softening of the Brain; Cross-Paralysis.—Dr. J. Lewis Smith presented a brain which he had removed from a case at Charity Hospital, under the following circumstances: The patient was aged fifty-two, and entered the hospital, September 24, 1875, complaining of pain in the occiput and lumbar region. There had been previously slight paralysis, but latterly this had improved. One afternoon, about one o'clock, while outside the building, in company with the convalescent patients, he became comatose, and, on examining him, the right side was found to be convulsed. The convulsions were of the tremor variety, and continued with intermissions every few minutes. At 2 P. M. the temperature was found to be $107\frac{3}{4}°$ on the right side, and $103\frac{1}{2}°$ on the left. At 3 P. M. the temperature was 108° on the right side, and 104 on the left. At 6 P. M. he died, comatose.

Autopsy.—The brain externally showed nothing abnormal, with the exception of atheromatous vessels at the base. On section, each lateral ventricle was found to contain between two and three ounces of fluid. The posterior part of the thalamus opticus and corpus striatum contained small cysts, and in the pons Varolii there was a slight extravasation, but not enough to account for the symptoms.

The most important point in the history of the case was the fact of cross-paralysis, the paralysis involving the left side of the face and right side of the body. This was due, in all probability, to the disease situated in the pons Varolii. Beyond the cysts there was not found any lesion to account for the convulsive attack.

Dr. Heitzman reported on a case of testicle presented by Dr. Sands about a year ago. It was of a decidedly malignant nature, and in part formed of round-celled sarcoma.

Bibliographical and Literary Notes.

ART. I.—*Sixth Annual Report of the Board of Health of Massachusetts.* 8vo, pp. 379. Boston, January, 1875.

THE Board of Health of Massachusetts continues active in its efforts to bring about a complete system of sanitary reform, and we are glad to observe the success which has attended its efforts.

Following the "General Report of the Board," Dr. Henry I. Bowditch writes a very pointed article entitled "Inebriate Asylums or Hospitals," in which he holds that all drunkards should be debarred from civil rights, and should be confined in asylums created for the purpose. His views are supported by sound arguments, and might with propriety be considered in all the States.

"The Value of Health to the State," by W. E. Boardman, M. D., is the subject of the next article. The author argues that the State can afford even large outlays for the health of the people, viewed simply as an economical investment.

J. C. Hoadley, Esq., contributes an excellent article "On the Transportation of Live-Stock," one with which every one concerned in the transportation of stock should be familiar.

Dr. Charles F. Folsom, Secretary of the Board, contributes an elaborate and very practical paper on "Our Meat-Supply and Public Health." In addition to the discussion of topics pertaining to known infections of meat, the author calls attention to injuries which meat frequently sustains by the fright and exhaustion of animals previous to slaughter.

J. N. Meriam, Esq., makes a report "On the Brighton Abattoir." Fleck and Pettenkofer have demonstrated that the "ground-atmosphere" becomes rich in carbonic acid the lower it descends. Wm. Ripley Nichols, in his article "On the Composition of the Air of the Ground-Atmosphere," makes use of their investigations. He does not attempt to explain the occurrence of carbonic acid in the quantity in which it is found, but explains its diffusion by the temperature of the soil and depth of the ground-water. It is not produced

by the ground-water. Pettenkofer[1] thinks it is due to the decomposition of organic matter in the soil. The author does not determine the practical conclusion of these investigations. Pettenkofer[2] lays great stress on the condition of the ground-atmosphere in the production of disease, and thinks, when the ground is charged with cholera-poison, that the temperature above induces a current in an upward direction, and thus disseminates the poison above-ground and propagates cholera.

"Ventilation of Railroad Cars," by Theodore W. Fisher, M. D., with "Chemical Analysis," by Wm. R. Nichols, is the subject of the succeeding article.

A very elaborate and carefully-prepared contribution is written by J. F. A. Adams, M. D., entitled "Cremation and Burial: An Examination of their Relative Advantages." The author gives a full history of *both methods* of disposal of the dead, and, after gathering all the evidence, *pro* and *con*, for either, arrives at the conclusion that burial, if properly performed, is sufficient for all sanitary purposes.

Following the above is an article entitled "Health of Towns;" and, closing the volume, is a "Report on the Sanitary Condition of the State-prison at Charlestown."

We wish that the Reports issued by the Board of Health of Massachusetts were to be found in the hands of all interested in sanitary science.

Art. II.—*The Pathological Significance of Nematode Hæmatozoa.* By T. R. Lewis, M. B. 8vo, pp. 54. Calcutta: Government Printing-Office, 1874.

The author of this small volume occupies a position in the British military service in India where he has had opportunities of investigating the occurrence of minute worms in the blood of pariah dogs, and has had some experience in their occurrence in the human species. He enters into an elaborate description of the nematode as it occurs in the dog, showing the points of difference between it and the *filaria sanguinis hominis*. A few fine plates accompany the description.

[1] "Cholera," etc., Hine. [2] Idem.

In dogs they are found to inhabit the œsophagus, aorta, and pulmonary vessels. They are found to exist in their larval condition in the *walls* of the œsophagus and vessels, giving rise to tumors in their coats. They are doubtless primarily found in the œsophagus, but, after development into *filaria* of not more than one-twelfth of an inch long, they migrate into the blood-vessels, in the fluid of which they grow to a length of from two to six inches. In the heart and pulmonary vessels they are sometimes found in numbers sufficient to occasion coagulation of the blood around the mass of hæmatozoa which obstructs the circulation.

The salient morbid phenomena associated with the presence of nematode hæmatozoa in man are described as conditions referable to the escape of the nutritive fluids—the blood or chyle, or both—out of their proper channels, or to an obstruction to their flow.

As far as observation has extended the exudation has been found to take place in two general ways, viz.: either into some excretory duct, such as the ureter—constituting the affection known as chyluria, or milky urine;[1] or into the cellular tissues, constituting the condition recognized as elephantiasis.

In a few cases of chyluria and elephantiasis examined by Mr. Lewis, *filariæ* were detected in the blood—a sufficient number, according to his opinion, to establish the etiology of these affections. It is also stated in a foot-note, on page 48, that Dr. Lonsin found a microscopic nematode in an Egyptian Jew who was affected with hæmaturia of Egypt, closely related to the *filaria sanguinis hominis;* and Dr. Wucherer discovered a nematode in the urine of a person suffering from hæmaturia of Brazil.

These investigations are interesting as they are novel, and should future inquiry establish the pathological connection claimed between the existence of *filariæ* in the blood and some of those affections the cause of which has hitherto been obscure, an important point will have been gained. We have given but a mere outline of the author's views.

[1] *Vide* Fayrer, "Clinical and Pathological Observations in India," London, 1873. Also Palmer, in *Indian Medical Gazette*, vol. viii., 1873.

ART. III.—*Researches into the Antagonism of Medicines; being the Report of the Edinburgh Committee of the British Medical Association.* By JOHN HUGHES BENNETT, M. D., F. R. S. E., etc. 12mo, pp. 100. London: J. & A. Churchill, 1875.

DR. BENNETT and his associates have performed a good work in bringing before the profession a more intimate knowledge of the action of medicines. The report before us is an outgrowth of the suggestion of the late Dr. Hughes Bennett, at the annual meeting of the British Medical Association of 1866, resulting in the appointment of a committee to report on the action of mercury. At the annual meeting of the Association in 1869, Dr. Bennett was again appointed to form a committee to report on the antagonism of medicines. After several years of labor the report is now before us, giving twelve classes of experiments upon rabbits, dogs, cats, rats, and mice, with the following in brief as some of the results: 1. Chloral hydrate mitigates the effect of strychnine, so that life may be saved by chloral after a fatal dose of strychnia, but strychnia is less likely to save life after a fatal dose of chloral. 2. The antagonism between sulphate of atropia and Calabar-bean is slight. 3. The effects of Calabar-bean are considerably modified by chloral, if the latter substance is given before the former. 4. Hydrochlorate and meconate of morphia in no way antagonize extract of Calabar-bean. 5. Sulphate of atropia is antagonistic to meconate of morphia within a limited area, but the limit is too narrow for practical service. 6. Tea, coffee, theine, caffeine, and guaranine, are somewhat antagonistic to meconate of morphia. 7. Strychnia and Calabar-bean modified the action of each other, but neither saved life after a fatal dose from the other. 8. Bromal hydrate and atropine are antagonistic, but, "while atropia may save life after a fatal dose of bromal chlorate, the converse apparently does not hold good."

The report is very interesting, and prepared only after much care and patience on the part of Dr. Bennett. The labor attending the performance of 619 experiments can hardly be appreciated by any but those who have investigated in the same channel. It is to be hoped that the Association

may continue to make appropriations for prosecuting a work so nobly commenced. The little volume is a handsome one.

Art. IV.—*Spinal Paralysis of the Adult; Acute, Subacute, and Chronic.* (*Inflammation of the Motor Tract of the Spinal Cord.*) By E. C. Seguin, M. D., etc. Pp. 39.

Infantile Spinal Paralysis. A Clinical Lecture. By E. C. Seguin, M. D., etc. Pp. 18. In one volume 8vo. New York: D. Appleton & Co., 1875.

The former of these articles was read before the New York Academy of Medicine last November; the latter was delivered at the College of Physicians and Surgeons in 1873.

In these very interesting articles the author shows the similarity that exists between the two affections named therein, in symptomatology, pathological anatomy, etiology, and prognosis. It is also shown that "spinal paralysis in the adult is to be classed with acute ascending paralysis, progressive muscular atrophy, and labio-glosso-laryngeal paralysis. In spinal paralysis, in both infants and adults, the lesion found is granular degeneration of the ganglion-cells of the anterior horns of the spinal cord. In progressive muscular atrophy the same condition obtains in those parts giving origin to the nerves supplying the wasted muscles; and in labio-glosso-laryngeal palsy those ganglion-cells in the floor of the medulla oblongata which constitute the nuclei of the origin of the hypoglossal nerves are degenerated.

The author, in absence of proof to the contrary, assumes that the degeneration of the nerve-cells in spinal paralysis takes its origin in inflammation; and as the disease affects the anterior horns below the decussation of the pyramids, and the posterior motor tract above the decussation, he chooses the name "inflammation of the motor tract of the spinal cord."

In respect to the influence of age in the etiology of the affections, the author's tables show the occurrence in no instance between the ages of seven and eighteen, leaving a gap of eleven years of immunity. As a matter of some interest

we might state that, of the cases which have come under our observation, one occurred at the age of thirteen. The patient so far recovered as to be able to walk with a cane.

The author's descriptions are exceedingly clear and interesting, and the volume is presented by the publishers in handsome style.

Art. V.—*The Diseases of the Heart and Aorta.* By Thomas Hayden, Professor of Anatomy and Physiology in the Catholic University of Ireland, etc. In Two Parts. 8vo, pp. xii.–1232. Philadelphia: Lindsay & Blakiston, 1875.

This is quite an elaborate work, being intended for an exhaustive treatise upon the affections of which it treats.

So far as may have been the author's design in bringing before the profession a comprehensive treatise, commensurate with the existing state of science, we may say he has succeeded very well. It is to a certain extent a compilation, yet much enriched by the extensive experience and investigations of the author.

The books are divided into ten chapters, the first being upon the "Anatomy and Physiology of the Heart." In Chapter X., "Diseases of the Aorta," thoracic aneurism is very well treated. The whole work indicates a thorough, familiarity, on the part of the author, with his subject. In the copious references we notice but slight recognition of American authorities in comparison with English, although, in the chapter on "Neuroses," due notice is taken of the condition described by Da Costa as "irritable heart." In respect to some of the author's special views we will simply state that he recognizes the influence of strain and over-exertion in the causation of organic heart-disease, yet he evidently, at the time of writing, had not become acquainted with Da Costa's investigations[1] of those factors.

The work is characterized by a little diffuseness of style, and is loaded down with a report of cases (150 in number) which, although illustrative, and in themselves interesting

[1] *Vide* "The Toner Lectures." Lecture iii., "Strain and Over-Action of the Heart."

enough, will scarcely be read by the busy American. The eighty-one illustrations are very good.

ART. VI.—*Importancia Clínica de la Temperatura en la Fiebre Tifoidea.* Tesis de J. A. LEDESMA. (Clinical Importance of the Temperature in Typhoid Fever.) 111 pp., 8vo, with Chromo-lithographic Tables. Buenos Aires: 1875.

COMMENCING with the general characters of the disease, the author examines the general principles which govern it, quoting largely from Wunderlich and Jaccoud. The different periods are then studied more particularly, as well as the influences which modify the febrile cycles. After investigating the influence exerted by the temperature on the organism and its functions, a parallel is drawn between the course of the temperature and the other signs of the disease. Finally, the indications afforded by the temperature are considered as regarding the diagnosis, prognosis, and treatment.

The author has renounced the use of baths, and agrees with Jaccoud in replacing cold water with lotions of aromatic vinegar, which has the advantage of procuring a more marked and enduring refrigeration, more actively exciting the cutaneous hæmatosis, and surrounding the patient with a fragrant atmosphere which reanimates him and insures the purity of the air. This method of treatment is completed by following out the other indications necessary to combat the consequences of excessive calorification. Sulphate of quinine is regarded as a coadjuvant which is preferable to digitalis.

The work is illustrated by thirty-two lithographic tables, sixteen of which are chromo-lithographs, showing the relative course of the temperature, pulse, and respiration.

ART. VII.—*The Gentle Treatment of Spinal Curvature.* By HEATHER BIGG. 16mo, pp. xii.–64. London: J. & A. Churchill, 1875.

THE author is an advocate of the "gentle" method of treating deformities of the spine. In a very pleasant way he

describes his appliances, with methods of application; and gives an account of the principles of treatment, with former methods. The author claims to have put elastic traction into use before either Mr. Barwell, or Dr. Prince, of Jacksonville, Ill., had published the same plan.

ART. VIII.—*The Treatment of Nervous Diseases by Electricity: A Review of the Present Extent of Electrical Treatment, with Indications for its Employment.* By Dr. FRIEDRICH FIEBER. Translated from the German by G. M. SCHWEIG, M. D. 12mo, pp. 64. New York: G. P. Putnam's Sons, 1874.

THIS little work is a concise, running account of the indications for the use of electricity. It is quite suggestive, although the author is rather more sanguine of success in certain cases than our experience will warrant. An author in recommending electrical treatment should always state whether faradic or galvanic is meant, and be precise as to the location of the electrodes. The book will repay perusal.

BOOKS AND PAMPHLETS RECEIVED.—Transactions of the Medical Association of the State of Alabama. Twenty-eighth Session. 1875.

Programme of General and Special Instruction in Physiology, Zoölogy, Comparative Anatomy, and Economic Entomology, with Rules of Health. Cornell University, Ithaca, N. Y., 1875–'76.

Anatomical Rooms: Plan for their Construction, Ventilation, and Hygienic Management. By H. Lenox Hodge, M. D., Demonstrator of Anatomy, University of Pennsylvania. Reprinted from *Virginia Medical Monthly*, October, 1875.

Uronology and its Practical Applications: A Guide to the Examination of Urine, etc. By George M. Kober, M. D., etc. Reprinted from the *Richmond and Louisville Medical Journal.*

Address before the Medical Association of the State of Alabama. By Dr. J. S. Weatherly, President. Extracted from the State Transactions for 1875.

Annual Oration before the Medical and Chirurgical Faculty of Maryland, April 14, 1875. Contribution to the Medical History and Physical Geography of Maryland. By Joseph M. Toner, M. D. Reprinted from "The Transactions of the Medical and Chirurgical Faculty of Maryland," 1875. Baltimore: 1875.

A Statement of the Relations of the Faculty of Medicine and Surgery in the University of Michigan to Homœopathy. Detroit: *Tribune* Printing Company, 1875.

Fracture of the Inferior Maxillary Bone. By Joseph T. Montgomery, M. D., of Sacramento, Cal. From "Transactions of the State Medical Society for 1875."

Vision: Its Optical Defects, and the Adaptation of Spectacles. Embracing, first, Physical Optics; second, Physiological Optics; third, Errors of Refraction and Defects of Accommodation, or Optical Defects of the Eye. With Seventy-four Illustrations on Wood, and Selections from the Test-types of Jaeger and Snellen. By C. S. Tenner, M. D. Philadelphia: Lindsay & Blakiston, 1875.

Transactions of the College of Physicians of Philadelphia. Third Series. Volume the First. Philadelphia: Printed for the College, 1875.

On Poisons in Relation to Medical Jurisprudence and Medicine. By Alfred Swaine Taylor, M. D., F. R. S., Fellow of the Royal College of Physicians and Lecturer on Medical Jurisprudence, Guy's Hospital. Third American, from the third and thoroughly revised English edition. With 104 Illustrations. Philadelphia: Henry C. Lea, 1875.

A Practical Treatise on Diseases of the Eye. By Robert Brudenell Carter, F. R. C. S., Ophthalmic Surgeon to St. George's Hospital, Surgeon to the Royal South London Ophthalmic Hospital, Hunterian Professor of Surgery and Pathology to the Royal College of Surgeons of England. With numerous Illustrations. London: Macmillan & Co., 1875.

On Altitude and Climate in the Treatment of Pulmonary Phthisis. By W. Gleitsmann, M. D. Reprinted from "Transactions of the Medical and Chirurgical Faculty of Maryland," April, 1875.

Climate of the United States, considered with Reference to Pneumonia and Consumption. By W. D. Bizzell, M. D., Mobile, Ala. Reprinted from "Transactions of State Medical Association."

Tinnitus Aurium; or, Noises in the Ears. Second edition, with Cases. By Lawrence Turnbull, Ph. G., M. D., Physician to the Department of Diseases of the Eye and Ear of Howard Hospital, Philadelphia. Reprinted from *Philadelphia Medical Times*, June and October, 1874. Philadelphia. Pp. 39.

Tinnitus Aurium. A Consideration of the Causes upon which it depends, and an Attempt to explain its Production in Accordance with Physical Principles. By Samuel Theobald, M. D., Surgeon to the Baltimore Charity Eye and Ear Dispensary. Reprinted from "Transactions of the Medical and Chirurgical Faculty of Maryland," April, 1875. Baltimore: Innes & Co., 1875.

On the Relation between Diabetes and Food, and its Application to the Treatment of the Disease. By Arthur Scott Donkin, M. D., Edinburgh,

M. D., Durham, Member of the Clinical Society of London, late Lecturer on Forensic Medicine and Examiner in Medicine in the University of Durham, etc. New York: G. P. Putnam's Sons, 1875.

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Treatment of Paralyzed Muscles by Elastic Relaxation. By John P. Van Bibber, M. D. Reprinted from "Transactions of the Medical and Chirurgical Society of Maryland."

A Lecture delivered at the Opening of the School for Nurses in Charity Hospital, August 10, 1875, by Prof. Joseph W. Howe, M. D., Visiting Surgeon to the Hospital, on the Care of Patients in the Surgical Wards, and the Best Means of saving Life in Certain Cases of Emergency. Reported by Dr. Carpenter.

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Cholera Epidemic of 1873 in the United States. The Introduction of Epidemic Cholera through the Agency of the Mercantile Marine: Suggestions of Measures of Prevention. By John M. Woodworth, M. D., Supervising Surgeon U. S. Marine Hospital Service. Washington: Government Printing-Office. Pp. 1025.

Reference and Dose Book. Vest-Pocket Anatomist. By C. Henri Leonard, A. M., M. D., Detroit.

A Rare Form of Monstrosity. Two Cases of apparently true Hermaphroditism. By W. L. Richardson, M. D., Visiting Physician to the Boston Lying-in Hospital, and Thomas Dwight, M. D., Professor of Anatomy at the Medical School of Maine. Reprinted from *Boston Medical and Surgical Journal*, September, 1875.

Reports on the Progress of Medicine.

SURGERY.

Prepared by Samuel B. Ward, M. D.

Congenital Dislocation of the Knee-Joint.—Drs. W. L. Richardson and C. B. Porter report two cases which were uncomplicated by any monstrosity, paralysis, or alteration of the articular surfaces, such as are usually seen in this peculiar form of congenital dislocation.

In the first case, the labor was in every respect a normal one. Soon after birth, the child lying on her back, the left leg was noticed to take a vertical position, the inner malleolus facing toward the umbilicus, and the foot being strongly rotated outward. The femur was apparently well formed, as were also the tibia and fibula. The inner lateral and crucial ligaments were greatly stretched, and probably somewhat undeveloped. The tibia was dislocated forward and outward, its head resting well up on the space between the condyles. The fibula had evidently followed the line of the dislocation, but in a much less degree. The whole appearance was that of a well-marked dislocation of both bones forward, with an outward rotation. Above and below the knee-joint were noticed two distinct furrows in the skin, which was itself considerably reddened in these furrows. There were no signs of any present or past inflammatory action about the joint. There was every evidence that the dislocation had occurred *in utero*. Bringing the bones into proper position, and applying a bandage to retain them so, was all that was needed in the way of treatment. At the end of two months, the child was carefully examined. The left leg was to all appearances like the other in length, size, and shape, nor could any difference be detected between the possible movements of the two knee-joints.

In the second case, first seen by the reporter six days after birth, the tibia and fibula were found to be dislocated forward upon the femur. The leg was in such an extreme state of tension that the anterior surfaces of the leg and thigh touched each other, the sole of the foot looking directly toward the face of the child, the toes pointing backward and the heel forward. The quadriceps extensor cruris seemed to be in the same condition as is seen in those muscles which produce the more common club-foot deformity. The outlines of the condyles of the femur and of the heads of the tibia and fibula could be distinctly recognized, but the patella was with difficulty made out. There was no evidence of inflammation, present or past, and the dislocation undoubtedly occurred *in utero*.

By gentle, firm, and constant traction, the leg could be brought down into a straight line with the thigh without giving the child any pain. When released it would immediately, and almost with a jerk, return to its abnormal position. Any attempt made to flex the leg caused evident pain, on account of the strong contraction of the extensor muscles. A modified Desault's apparatus for fractured leg was applied, which, being removed a number of times, was worn for six weeks. A splint, bent at an obtuse angle, was then used for two weeks, and afterward replaced for one bent at a right angle. After this had been worn for a few weeks, the angle was frequently varied, the splint being changed every few days, so as to prevent any anchylosis. Occasionally the child was allowed to go without any thing on the leg, so as to develop the muscles. A careful examination now shows no apparent difference between the two legs, and the child can flex

the leg naturally, and has lost the power to extend it abnormally, although at times the bones seem to glide a little upon each other, owing to the continued relaxation of the ligaments.

So meagre is the literature of this subject that these two cases form an interesting addition to it, especially as they proved so amenable to treatment.—*Boston Medical and Surgical Journal*, September 16, 1875.

On Ligature of a Main Artery, to arrest Acute Traumatic Inflammation.—Mr. C. F. Maunder's third lecture, in the recent Lettsomian course on the "Surgery of the Arteries," is devoted to this subject. The theory on which this treatment is based is, that after severe injuries, the inflammation, in some cases, far exceeds, in grade, the amount which is necessary for, or compatible with, the reparative process, and that the usual antiphlogistic remedies fail to arrest it. If vigorous measures be not adopted, either prolonged and exhausting suppuration, or extensive gangrene results. In such cases Mr. Maunder, in 1866, recommended diminishing the supply of blood to the part by the ligature of the main vessel of the extremity involved, and the practice was followed by the happiest results.

The following facts and conclusions are quoted from his lecture:

That ligature of the superficial femoral artery has arrested acute inflammation consequent on wound of the knee-joint.

That ligature of a main artery will quickly diminish profuse suppuration, and prevent death by exhaustion.

That, while it arrests profuse suppuration, it will, by allowing the patient to gain strength, afford an opportunity for amputation at a future time.

That gangrene and secondary hæmorrhage, as the result of ligature, should not be anticipated in the healthy subject.

That the dread of these has arisen from our knowledge of the consequences of the ligature in instances of known diseased vessels—aneurism, for example.

That a slough on the heel, caused by the pressure of a splint, was quickly detached, and the wound soon closed, although the superficial femoral had been tied a few days previously.

That symptoms of inflamed bone ("starting-pains") quickly disappeared.

That the arterial tension of the rest of the body will be increased beneficially by the ligature.

In conclusion, the lecturer stated that he long supposed that he was the first to suggest this method of treatment; but research into the literature of the subject had shown him that it was practised in America long before he was born. It was done for the first time by Henry U. Onderdonck, M. D., in 1813, and afterward by David L. Rogers and Valentine Mott, of New York City, of which facts Mr. Maunder was, in 1866, entirely ignorant.—*London Lancet.*

An Antiphlogistic Method of dressing Operation-Wounds.—Mr. Jonathan Hutchinson is induced to publish this, from the unusually satisfactory results which have followed its use.

No blood should be left in the wound, nor should there be any danger of bleeding. To this end, use all the silk ligatures that are necessary, and leave the wound open an hour or two, rather than close it while there is still oozing. A drainage-tube left in the most dependent portion of the wound is a safe precaution. In the case of removal of the breast, make a counter-opening at the most dependent part, and insert a drainage-tube, to be removed on the third day. Coapt the edges of the wound carefully with numerous fine stitches. Great care should be taken that none of the latter are tight, and they should all be taken out on the third or fourth

day. After the sutures, narrow strips of plaster should be applied, and remain on for five or six days. The essential feature in the plan is to keep the parts cool by the systematic application of a lead-and-spirit lotion. The lotion consists of half an ounce of liquor plumbi, and an ounce and a half of spirit, to the pint of water. After the wound has been sewed up as above directed, apply, over the plasters, a lint compress wet with the lotion, and over this a mass of cotton-wool, which is kept in place pretty tightly by a flannel bandage. This is applied to prevent oozing, and should be taken quite away in from six to twelve hours, when an ample fold of lint, wet with the lotion, should be applied over the wound and surrounding skin, and the nurse should have emphatic directions to remoisten it every quarter or half hour, according to the rate at which it dries. The skin ought to become whitened by deposit of lead. No bandage or other dressing is necessary, and the lotion should be continued without intermission until the wound is perfectly sound—a week, or two weeks, as the case may be.

If one is obliged to leave a portion of the wound open, the lotion may still be used, and is even more necessary. Mr. Hutchinson feels confident that, in many cases of open wounds so treated, diffuse inflammation has been prevented.—*London Lancet.*

Neuralgia treated by Nerve-Stretching.—Mr. Calender, of St. Bartholomew's Hospital, has recently delivered a clinical lecture on this subject, in which, after calling attention to the frequency of a painful condition of the nerves after amputation and other injuries, he says that several conditions suggest themselves as possible causes of this irritation: 1. The nerve may have been liable to strain in extending the limb. 2. The tissues about the nerve may have become thickened, and in this way the nerve become so fixed to adjacent structures as to lose that freedom, that independence, which in the natural condition of parts insures a certain latitude of gliding to all nerves about joints, especially those which are moved in flexion and extension. 3. The nerves in a stump may also be irritated by having contracted adhesions to muscles, and thus become liable to be pulled—perhaps we should say twitched—in the movements of the muscles. 4. Bands of adhesion may form across nerves, and in the contraction of these, nerves may be compressed and so be irritated. 5. A nerve may for some distance be surrounded by dense, contracting tissue, which may compress it and so give rise to irritation of its fibres. 6. There may be inflammation of the nerve itself, or of its immediate covering; and observations have been recorded, showing that inflammation of the spinal cord has followed irritation of peripheral nerves. The irritation of one given peripheral nerve may be carried to the spinal cord and by reflex action produce symptoms in other nerves more or less remote. When this painful condition is severe and long-continued, it gives rise to important changes in the nutrition of the parts supplied by the nerve or nerves involved.

In treating these cases, it is important to determine carefully the extent of the affection—to decide whether you are dealing with one nerve only and its distal ramifications; or whether you have to remedy a mischief which, beginning, it is true, in the irritation of a single nerve, has involved a wider area by extending toward, and being reflected from, a nerve-centre; whether, this being the case, this extension is limited to nerves closely allied in origin; or, lastly, whether it involves nerves far remote from these. In the first and simplest case, such measures as rest of the part and the local use of sedatives, or freeing the nerves from pressure, or from local irritation, will suffice. When the nerve-centres have become involved, and especially if pain is experienced in remote parts, even removal

of a portion of the nerve and reamputation have often failed to afford relief.

When a single nerve is primarily involved, even though others in the neighborhood are secondarily affected, stretching the nerve frequently eases the patient. The operation of cutting down upon a nerve, freeing two or three inches of it from its attachments, and stretching it, is almost free from danger. There is no reason to apprehend any trouble on the part of the nerve-centre, and the functions of the peripheral portion of the nerve often remain intact. It is probable that the stretching is of use by numbing the nerve for a short time, thus breaking the transit of the abnormal impressions conveyed by its fibres, and in the interval thus gained the centres may reassume their natural control. It is quite possible also that the relief is sometimes due to the breaking up of adhesions.

In one case in which Mr. Langstaff was obliged to reamputate the arm, he took the precaution during the operation to draw out each nerve half an inch before dividing it, and the neuralgia was cured.

As to the permanency of the cure by this operation, time enough has not yet elapsed since it was first put into practice to enable us to make any positive statement. In one case fourteen months have elapsed without any return of the neuralgia.—*London Lancet.*

Translations.

On Atresia of the External Auditory Canal.—At a meeting of the Vienna Medical Society, Prof. Gruber (*Med.-chirurg. Centralblatt*, No. 8, 1875) presented two patients, a girl eleven years and a woman twenty-eight years of age, both of whom were affected with atresia of the external auditory canal; in the younger patient this condition existed in both ears, in the older only in the right ear, though the diameter of the left external canal was already so contracted as only to admit a probe three-quarters of a millimetre in diameter. In both individuals the occlusion had resulted from neglect of proper care and treatment during chronic inflammation, and in both the hearing-power was diminished in a marked degree.

Atresia is either congenital or acquired. The congenital variety is rarely found without the coexistence of malformations and defective development. In such cases, either portions of the external ear alone are wanting, or their development has been rudimentary; or, what is worse, this malformation is combined with defective formation of the deeper structures, even of the labyrinth, in which case deafness of the affected ear must be the result, while, when only sections of the external and middle ear are wanting, a considerable

degree of hearing-power can exist even with atresia of the auditory canal, provided any of the structures of the labyrinth are *intact.* Gruber has first demonstrated that, as in case of deformed auricle, which is occasionally attached in an anomalous position at the side of the head when there is defective development of the external ear, the situation of the deeper structures is likewise to be sought in a different location before a positive decision is given concerning their complete absence. This relation should be borne in mind the more when the question arises of forming an auricular canal by operation. The author further observed that, in the new-born, a positive opinion concerning the future hearing of the child should never be given until the child has attained an age when the hearing-power can be tested with hope of success. When such a child has attained the age in which children usually react to external irritation of the auditory nerve, and it does not react to tones and sounds, there is evidence that the deeper structures are defective, and then the prognosis is unfavorable. However, it must be remembered that in some children the hearing-power commences at a late period. Gruber likewise recommends that the surgeon should be guarded in performing the operation at the desire of the parents, for it is very possible that it might be performed without any hope of success; and, when at a later period the indication for operation might present itself, the rules which he has laid down should be borne in mind. In regard to the acquired forms, he says that usually they are the result of badly-treated inflammations, or of diseases whose effect is ulceration or cicatricial formation. Thus, Gruber once operated in a case of atresia occurring after lupus, another after epithelial cancer. Though the occlusion may occur at any portion of the canal, the inner half is more often affected than the outer. Owing to the peculiar construction of the external canal in the new-born and in the young child, when the osseous portion of the canal is not yet fully formed, adhesions may easily take place between the already closely approximated walls of the canal; and this is also the reason why in children during the first years of life the walls grow together, a fact which has been sufficiently proved by statistics. In speaking

of the pathological changes which are presented in such adhesions of the external canal, he called attention to the fact that the occlusion rarely takes place by means of the soft structures alone. As a rule, hyperostosis on the bony walls occurs during the process of chronic inflammations, which finally occludes the whole canal. An examination then reveals the external canal closed by bony structures covered by cutis. In the two cases presented, this condition prevailed once on the right side and once on the left; while in the right ear of the younger patient the occlusion was made up of soft cicatricial tissue. Prof. Gruber believed that the two cases were proper subjects for operation, which he intended to perform by means of galvano-cautery. E. F.

Presence of Micrococcus and Bacteria in the Walls of Hospital Wards.—The analyses of the air, and other experiments made by Pasteur, for the purpose of investigating the doctrine of spontaneous generation, have demonstrated that the germs of inferior organisms—micrococci, bacteriæ, etc.—are everywhere present in the air. In a hospital the air contains a greater number of these elements, and in addition certain special bodies, such as pus-globules, spores of epiphytic parasites, which emanate from diseased organisms, and, owing to their volatility after desiccation, are susceptible of hovering in the atmosphere. In 1865, M. Broca discovered pus-globules in the liquid expressed from the sponge with which the walls of one of the wards of the St. Antonio Hospital had been washed. In 1860, M. Chalvet was inclined to attribute the blue coloration which is often observed in the vicinity of wounds to the presence of microscopic algæ of the species *Palmella*. In 1861, Dr. Eiselt, of Prague, placed an instrument, analogous to the aëroscope of Pouchet, between two beds, in a ward occupied by thirty-three children with purulent ophthalmia; the apparatus consisted of a glass plate coated with glycerine, and pus-globules were distinctly seen. To the above and analogous facts, which are recorded in the dissertation of Dr. Deville (Strasbourg, 1860), are to be added the recent experiments of Dr. Nepven, of Paris: One square metre of wall in the surgical ward of La Pitié having been

washed after neglect for two years, the liquid expressed from the sponge (about thirty grammes) was examined immediately afterward. It was black, and showed micrococcus in large amount, several microbacteriæ, epithelial cells in small number, several pus-globules, several red globules, and, lastly, irregular, blackish masses and ovoid bodies of unknown nature. The experiment was conducted with all possible precautions. The above facts furnish an indication concerning the constituent elements of the so-called nosocomial poison. We can comprehend how the air of hospitals may contain the germs of a great number of maladies, and easily become the true centre of infection. In private practice the same conditions may obtain, though in a minor degree, especially in winter, from the prolonged confinement of patients in rooms with insufficient ventilation.—*Revue méd. de l'Est, Revue de Thérapeut.*, No. 23, 1874. E. F.

Bromide of Potassium as a Caustic and Anæsthetic in Ulcerated Malignant Tumors.—At a recent meeting of the Société de Méd. et Chir. at Bordeaux, M. Peyraud reported that, having had to treat in one of his patients a voluminous cancroid of the face, the extirpation of which was contraindicated, and which gave rise to intense pain, the idea occurred to him of applying finely-pulverized bromide of potassium to the ulcerated surfaces. After the first dressing the pains moderated and the fungous portions seemed to undergo retraction. Encouraged by this result, the author on the same day made a second application with equal benefit. This dressing was continued twice daily for twenty-eight days, at the end of which period the tumor had so diminished in volume that it did not extend beyond its implantation. In this case, the author attributes the favorable influence of the bromide to a double action. First, the nervous ramifications when in contact with the remedy are rendered insensible, and hence the pain diminishes. Then, by virtue of its action on the vaso-motor system, the bromide causes a permanent contraction of the vessels of the tumor, whose volume therefore becomes reduced. At the same time a mild caustic action of the remedy mortifies the superficial layers, which must be detached at each dressing by

cleansing the ulcerated surface with fresh water. After this preliminary operation it is necessary merely to sprinkle the tumor with the powder and to cover it with a pledget of lint. —*Rev. de Thérap. Méd.-Chir.*, October, 1874. E. F.

Herpes Zoster of the Shoulder.—Dr. Giné relates the case of a female with a zona situated in the dorsal region, on a level with the seventh dorsal vertebra, extending toward the right side. In addition to the acute pruritus of the surface, the patient complained of deep pain, which the doctor found by pressure to be situated two centimetres below and to the outer side of the eruption. The case was thought to be a neuralgia of the cutaneous branch of the seventh dorsal pair, causing an eruption of zona corresponding to the terminal extremities of this nerve. After an hypodermic injection of two centigrammes of morphine in one gramme of water there was an immediate cessation of the deep pain and the itching, followed by a rapid resolution of the eruption. After three or four days the eruption entirely disappeared, leaving but a slight desquamation.

Dr. Giné thinks that *zona dorsalis* should be added to the varieties already enumerated by Hebra; that the most rational treatment is to apply the remedy directly to the seat of pain, and that the success obtained in this case should lead to the generalization of this method of treatment.—*Independencia Med. de Barcelona*, and *La France Méd.*, December, 1875.

G. R. C.

On the State of the Pupil during Surgical Anæsthesia from Chloroform.—In the Société de Biologie de Paris, M. Bodin remarked that in numerous cases of anæsthesia from chloroform he had observed a correspondence between the condition of the pupil and the state of insensibility, which might serve as a guide in the administration of the anæsthetic. With M. Cogne he has made experiments on animals in order to verify the results of his clinical observations. His observations were made—1. During the administration of chloroform; 2. When vomiting supervened; 3. After intra-venous injection of chloral.

1. When chloroform is administered, the pupil, which dur-

ing the stage of excitement is insensible to the action of light, dilates, then gradually contracts when anæsthesia is accomplished; and, when the latter is complete, the pupil is immobile and contracted, not responding to any excitation. 2. During the administration of chloroform, vomiting sometimes takes place; if the subjects are completely anæsthetized, the contracted pupils dilate widely during every effort of vomiting. 3. Following the intra-venous injection of chloral, Bodin and Cogne have observed the same phenomena. The only difference between chloral and chloroform is, that with chloral the pupil is contracted and punctiform, while with chloroform the contraction is less marked.—*Lyon Médicale*, No. 8, 1875. E. F.

Miscellany.

Appointments, Honors, etc.—G. F. Markoe, of Boston, was elected President of the American Pharmaceutical Society, and John M. Maisch, of Philadelphia, Secretary, at the recent meeting in Boston. Dr. Beaubien has resigned the chair of Practice of Medicine in Victoria Medical College, Montreal, and Dr. J. P. Rottot has been appointed in his place. Dr. Steeves has been appointed Medical Superintendent of the New Brunswick Provincial Lunatic Asylum. The late John E. Spencer, M. D., of Morristown, N. J., by his will, bequeathed to Jefferson College the sum of $1,000, to be added to the building-fund of the college.

Sir Duncan Gibb has resigned his office of Physician to Westminster Hospital, on account of ill-health. Dr. Smith-Shand has been appointed to the chair of Medicine in the University of Aberdeen, in the place of Dr. Macrobin, resigned. Sir James Alderson, Knight, M. D., and Arthur Farre, M. D., have been appointed Physicians Extraordinary to Queen Victoria. Sir Robert Christison has been elected President of the British Association for the year 1876. Dr. Moritz Schiff, of Florence, has received, by unanimous vote of the Turin Academy, the Riberi Prize of

about $4,000, for his "Contribuzione alla Fisiologia Patologica dell Midollo Spinale." Dr. Dieulafoy has been rewarded by the Academy of Sciences with the "Prix Monthyon," for his interesting work on "L'Aspiration des Liquides morbides," and for the service rendered by his pneumatic aspirator to medicine and surgery. Dr. James Bell Pettigrew, F. R. S., has been appointed to the chair of Medicine in the University of St. Andrews, Edinburgh, made vacant by the death of Dr. Oswald Home Bell. Dr. Liebreich, of Berlin, has received a diploma of honor from the Vienna Exhibition for his discovery of the properties of chloral.

The Late Dr. Kammerer.—At a regular meeting of the Medical Board of St. Francis's Hospital, the following preamble and resolutions were unanimously adopted:

Whereas, our respected friend and colleague, Dr. Joseph Kammerer, has been removed from us by death: therefore—

Resolved, That we, the Medical Board of St. Francis's Hospital, bear testimony to his genial disposition, his untiring devotion to his patients, and to the interests of the profession at large.

Resolved, That in the death of Dr. Joseph Kammerer the medical profession of New York has sustained a severe loss, and St. Francis's Hospital a valued friend and adviser.

Resolved, That we express our sympathies with the family of our deceased friend, and transmit to them a copy of the foregoing resolutions.

Carl H. Sellman, M. D.,
Joseph W. Howe, M. D.,
Walter R. Gillette, M. D.

The Health of Medical Students.—The *Medical Times and Gazette* devotes an excellent editorial to the subject of health as a qualification for the medical profession, enumerating the various and severe trials to which the health of student and practitioner is subjected from the beginning to the end of a medical career. There is no doubt that many useful lives would be saved, and much disappointment avoided, if young men, before committing themselves to so arduous a

profession, were to estimate more carefully their own powers, physical and mental, with a view to their competency to maintain the struggle necessary to insure even a moderate success in medicine. The misfortune is, that men often do not know their own powers until they have been put to the fatal test.

The New Paris Hospital.—The new Hôpital Menilmontant, situated between the Lariboisière and the St.-Antoine, will be opened before the end of the year. The hospital and grounds have cost 9,343,000 francs. It is to contain one hundred and fifty beds, and is built on the separate-partition principle. The wards are spacious, and provided with every modern appliance for the comfort and welfare of patients. Special care has been bestowed on the lying-in department, which is entirely separate from the rest of the hospital.

The Canada Medical Association.—The eighth annual meeting was held in Halifax, August 4th and 5th, Dr. Botsford, President, in the chair. Dr. P. Pineo, U. S. N., represented the American Medical Association, and Dr. John E. Tyler the Massachusetts Medical Society. Dr. E. F. Hodder, of Toronto, was elected President for the ensuing year, and Dr. David, of Montreal, General Secretary. The next meeting will be held in Toronto.

Special Hospitals.—The *Lancet* and *Medical Times and Gazette* are both unsparing in their ridicule of the opening ceremonies of the Central London Throat and Ear Hospital, of which the first stone was laid recently by Madame Adelina Patti. The multiplication of special hospitals is deplored as a crying evil; but it is only a natural result of the cultivation of special branches of medicine and surgery, which is an evil only in its abuse.

International Congress of Physicians.—This meeting was opened September 18th, in Brussels, with much ceremony, the King of the Belgians being present in person. Dr. Vleminckx was elected President, and Dr. Warlomont Secretary-General. The following gentlemen were elected Honorary

Presidents: Mr. Bowman, Drs. Bouillaud, Jaccoud, Larrey, Verneuil, Semmola, Palasciano, Langenbeck, Graefe, Sigmund, and Hebra.

A Sure Cure for the Opium-Habit.—Mr. Grover, the President of the British Pharmaceutical Conference, recently held in Bristol, called attention to the evils resulting from the sale of patent medicines. He mentioned as an instance one medicine advertised and sold as "a sure cure for the opium-habit," and which was found to contain two-grain doses of morphia, to be taken three times a day.

The British Association for the Advancement of Science.—The annual meeting of this Society was held in August and September, in Bristol. Valuable papers were read by Prof. Rolleston, Drs. Brunton and Smith, Dr. F. J. Mount, Prof. Cleland, and Mr. W. J. Cooper. Sir Robert Christison was elected President of the meeting to be held in Glasgow, in September, 1876.

The University of Michigan.—We have read with much regret the lengthy appeal for sympathy put forth by some of the Medical Faculty of this university, in the vain hope of justifying themselves in the endeavor to serve two masters. They have but one course before them that will be indorsed and applauded by the entire profession.

Education in Siberia.—The new Governor-General of Western Siberia recommends the immediate creation of a University of Siberia, to consist of two Faculties, of Law and Medicine. The Russian Government is said to favor the plan, as great difficulty exists in obtaining educated men to fill the public offices. There is an especial lack of physicians, of whom there are not more than fifty in all Siberia.

Corrections.—In Dr. T. R. Varick's article which appeared in the October number of this JOURNAL, the following errors occur: p. 376, twentieth line from top, "eleventh" should read *twenty-first;* p. 377, ninth line from top, insert *between* after the word "shortened;" also, same page, fourteenth line

from top, read *hypinosis* instead of "hyperinosis;" p. 379, eighth line from bottom, "hyperinosis" should read *hypinosis*.

Journalistic Notes.—The *Philadelphia Medical Times* has been changed from a weekly to a biweekly journal, and appears now in a tinted cover, and with twenty-four pages instead of sixteen. A new monthly journal, the *West Virginia Medical Student*, is announced to appear early this month, by Dr. James E. Reeves, Wheeling.

New French Prizes.—The Académie de Médecine has recently received two legacies: one of 30,000 francs, by M. Desportes, for the foundation of a prize in therapeutics; and another of 100,000 francs, by M. Demarquay, which will probably be employed in founding an annual prize for the best work in anatomy or pathology.

Sanitary Work in the State of New York.—Dr. A. N. Bell, chairman of the Committee on Hygiene appointed by the Medical Society of the State of New York, has addressed the following circular to the various county medical societies throughout the State, with a view to organization for thorough and systematic sanitary work:

All the county societies have by this time received the "Transactions" of the State Society for 1875, containing the second report on "Defective Drainage as a Cause of Disease in the State of New York." And while there are several county society committees which have not yet completed their reports on that subject, there are others anxious to proceed with the investigation of other subjects. Therefore, that no disposition to labor in this field may be lost, the following classified schedule, comprehending a selection of subjects of inquiry more or less applicable to all, is submitted, with the hope of eliciting many special reports:

Air.—Importance of purity; space; impurities from special causes; analysis; diseases produced by impurities; warming; clothing; ventilation.

Water.—Supply; means of distribution; source; quantity; quality analysis; diseases caused by impurities; purification.

Habitation.—Boundary, district, division, domicile; climatology; physical geography; geology; meteorology; hu-

midity; buildings—new and old; churches, ventilation of; church-yards and church-vaults; school-houses; factories; institutions; prisons—comprehending structure, building-material, organization, care, food and water supply; space; aëration; disposal of slops; house and soil drainage; in short, their relations to the health of their occupants and surroundings in all respects.

Epidemics and Endemics.—Etiology; control; disinfection; destruction; prevention.

Education.—Childhood and youth, provision for; ages; mental and physical; hours in school; home-study; precautions for preserving and protecting health; professional education—physicians, coroners, nurses, midwives.

Drugs and Drug Establishments.—Apothecaries, qualifications of; dispensing medicines; poisons—safeguards; miscellaneous medicine-taking, quackery; "opium-eating;" intemperance; therapeutic value of alcoholic liquors; diseases caused by alcohol; alcoholic impurities as a cause of disease; analysis of alcoholic liquors.

Marine Hygiene.—Air-space; impurities; effects of the impure air of vessels on merchandise; ventilation; food and water; clothing; sanitary relations respectively of sailing and steam vessels; canal-boats; fuel; cargo; stowage in relation to health; antiscorbutics; relative liability of articles of commerce to infection; portability of disease; passenger-vessels; immigrants; commercial diseases; quarantine.

Nuisances.—Means of abatement.

Vital Statistics.—Births, marriages, diseases and deaths; life-expectation in the United States in the aggregate; in regard to whole period of life; life-expectation of the diseased—phthisis, Bright's disease, heart-disease, gout, rheumatism, of any diathesis; registration of diseases.

Attention is invited to to the following resolution adopted by the State society, 1873:

"That the Secretary be instructed to urge upon the county societies the importance of having Committees on Hygiene in coöperation with the standing Committee on Hygiene of the State society, and that the investigations of said committees in this regard, on the approval of their respective county societies, be forwarded to the Committee on Hygiene of the State society in time to be summarized by that committee in their annual report."

A Supposed Testicle removed from the Vagina of an Hermaphrodite.—Dr. L. Rodgers reports in the *Cincinnati Lancet and Observer*, September number, the case of an unmarried woman, aged thirty-eight, from whose vagina a tumor was re-

moved, which was afterward found to present all the natural characteristic constituents of a testicle. The individual in question was hermaphroditic, and is described as follows: She is of medium size, weighing one hundred and thirty; her voice is quite husky, resembling that of a man; sallow complexion; face is devoid of hair. The mammary glands are absent, while the breast is thickly set with hair. The mons veneris is thickly covered with hair, the labia majora and minora are well developed, and the vaginal orifice is comparatively small, scarcely admitting the introduction of a female catheter.

The clitoris is absent, and occupying its position is a fully-developed penis, excepting the absence of a prepuce. The penis, in the flaccid state, would measure about three inches in length and one in thickness. It is, however, curved downward, there being a web-like membrane extending from the glans to the upper junction of the labia majora, along the under side of the penis. This membrane is about a line in thickness, and arises from the root of the penis like a round cord, and then spreads out like a fan, being attached as above stated.

The patient states that when the penis becomes erect this fan-like membrane draws the penis down, with the glans pointing toward the vaginal orifice. The tumor was attached by a long pedicle to the root of the penis.

The Late Dr. Krackowizer.—At a meeting of the Medical Board of the New York Hospital, held September 24, 1875, the following resolutions were passed:

Whereas, It has pleased an inscrutable Providence to remove from his sphere of usefulness in this world, in the prime of manhood and the fullness of his powers, Dr. Ernest Krackowizer, our late associate in this Board: therefore—

Resolved, That, in the death of Dr. Krackowizer, this hospital has lost one of the ablest counselors and most accomplished surgeons that have ever adorned its staff.

Resolved, That, as his associates, we are called upon to mourn the loss of one whose personal character and exceptional attainments and ability as a surgeon have always commanded our highest admiration and most implicit confidence.

Resolved, That the death of our lamented colleague creates a void in the ranks of our profession which will be long and deeply felt, and that the example of his loyalty to his high calling, his rare attainments, and rich experience, have contributed in an eminent degree to elevate the standard of professional excellence in this community.

Resolved, That a copy of these resolutions be transmitted to the family of the deceased, and be published in the medical journals.

CHARLES E. HACKLEY, M. D., *Secretary.*

The Medical Register.—We learn from a circular issued by Dr. Purdy, editor of the "Medical Register of New York, New Jersey, and Connecticut," that he is preparing as rapidly as possible a revised list of the physicians of this city and Brooklyn, with an index to the entire "Register," the whole of which will be forwarded, free of expense, to all subscribers to the "Register." Dr. Purdy makes the following explanation:

"Messrs. G. P. Putnam's Sons were not responsible for the manufacturing of this volume, the editor having for this year made use of their services only for its publication and sale. The editor regrets that in spite of his care, the type selected, and the quality of the presswork, were not fully up to the standard arranged for. He will, however, make such arrangements as will insure the publication against any inferior work in future issues. He is further convinced that, notwithstanding these slight imperfections, the volume as a whole will be found more valuable and more complete than any previous issue."

Styptic Cotton.—Dr. Thomas G. Morton, in the *Philadelphia Medical Times*, recommends the following method of preparing styptic cotton:

Take a roll of fine jeweler's cotton and thoroughly saturate it in a mixture of Monsel's solution of the subsulphate of iron, diluted with two parts of water; let it stand in the mixture for forty-eight hours; press the liquid out, and dry in a warm room, then pick or card out in fine shreds. It is better to make in small quantities, as there seems to be some change in the cotton when kept for any length of time, it losing its texture and breaking up in a fine powder when handled, thus rendering it unfit for application.

Urticaria.—A French physician, himself a subject of this disease, being seized with severe urticaria, had the happy idea of bathing the feet and legs in hot water well dosed with mustard. Hardly had he dipped his extremities in the bucket, when, vastly to his satisfaction, every discomfort disappeared —*Medical and Surgical Reporter.*

Army Intelligence.

Official List of Changes of Stations and Duties of Officers of the Medical Department, United States Army, from September 14 *to October* 13, 1875.

McParlin, T. A., Surgeon.—Assigned to duty as Chief Medical Officer, District of New Mxico. S. O. 182, Department of the Missouri, September 28, 1875.

Webster, Warren, Surgeon.—Assigned to duty at Plattsburg Barracks, N. Y. S. O. 204, Military Division of the Atlantic, October 11, 1875.

Byrne, C. C., Surgeon.—Assigned to duty at Fort Snelling, Minn. S. O. 177, Department of Dakota, September 13, 1875.

Wright, J. P., Surgeon.—When relieved by Surgeon McParlin, assigned to duty at Fort Leavenworth, Kansas. S. O. 182, C. S., Department of the Missouri.

Janeway, J. H., Assistant Surgeon.—To report to the commanding general, Department of the South, for assignment to duty. S. O. 201, A. G. O., October 6, 1875.

Huntington, D. L., Assistant Surgeon.—Assigned to duty as Attending Surgeon at the Soldiers' Home, near Washington, D. C. S. O. 192, A. G. O., September 22, 1875.

Brown, J. M., Assistant Surgeon.—When relieved by Surgeon Webster, assigned to duty as Post-Surgeon, Fort Wood, N. Y. H. S. O. 204, C. S., Military Division of the Atlantic.

Phillips, H. J., Assistant Surgeon.—Granted leave of absence for two months, on surgeon's certificate of disability. S. O. 188, C. S., Military Division of the Atlantic.

Brooke, John, Assistant Surgeon.—Assigned to duty at Raleigh, N. C. S. O. 132, Department of the South, September 13, 1875.

Taylor, M. K., Assistant Surgeon.—Assigned to duty as Post-Surgeon, San Antonio, Texas, to date from September 1, 1875. S. O. 179, C. S., Department of Texas.

O'Reilly, R. M., Assistant Surgeon.—Granted leave of absence for one month. S. O. 187, Military Division of the Atlantic, September 21, 1875.

WILSON, WILLIAM J., Assistant Surgeon.—Granted leave of absence for one year, with permission to go beyond sea. S. O. 190, A. G. O., September 20, 1875.

HARVEY, P. F., Assistant Surgeon.—Granted leave of absence for one month, on surgeon's certificate of disability. S. O. 182, Military Division of the Atlantic, September 13, 1875.

PAULDING, H. O., Assistant Surgeon.—Assigned to duty at Fort Ellis, Montana Territory. S. O. 190, Department of Dakota, September 29, 1875.

TAYLOR, B. D., Assistant Surgeon.—Assigned to duty at Fort Rice, Dakota Territory. S. O. 187, Department of Dakota, September 25, 1875.

WOOD, M. W., Assistant Surgeon.—Assigned to duty at Camp Sheridan, Nebraska. S. O. 105, Department of the Platte, September 25, 1875.

WEEDS, J. F., Surgeon.—Died at Nashville, Tenn., on October 1, 1875.

Obituary.

DR. ERNST KRACKOWIZER, whose death occurred in Sing Sing, September 23d, was born in Spital-am-Pyhrn, in the archduchy of Upper Austria, December 3, 1821. He began the study of medicine in Vienna in 1840, receiving his degree five years later. For political reasons he was obliged to leave Austria, and after a period spent in travel he emigrated to the United States in 1850. In 1857 he settled in this city, where his superior abilities and attainments were soon appreciated. He held appointments in the old New York Hospital, the Mount Sinai Hospital, Bellevue Hospital, and the German Dispensary and Hospital, and was a prominent member of the leading medical societies. His death at so early an age is a great loss to the profession, and will be sincerely lamented by a large circle of friends. He was remarkably kind and benevolent, but always in the most unostentatious manner possible. The cause of death was typhoid fever.

HORATIO STONE, M. D., well known as a sculptor, whose death occurred in Italy, September 21st, was a practitioner

of medicine for nearly thirty years before he devoted his attention to art. He was sixty years of age at the time of his death.

Dr. Toler T. Maunsell, M. B., Dub., M. R. I. A., of Dublin, died August 17th. He was secretary of the Irish Poor-law Medical Officers' Association, and was an ardent and indefatigable advocate of sanitary reform in Ireland.

Dr. Alexander Fleming, of Birmingham, England, died August 21st. He was known abroad chiefly in connection with his researches on the action of aconite.

Dr. George W. Peete, who lost his life by the recent storm and flood at Galveston, was City Physician and Quarantine Officer of that city. He was sixty-three years of age, and was widely known and respected.

The *Lancet* records the death, at the age of forty-six, of Dr. F. W. Headland, well known in this country as the author of an excellent and popular work on the "Action of Medicines." Dr. Headland was senior physician to Charing Cross Hospital, and was highly esteemed by his professional brethren.

The death is announced of Dr. Duchenne de Boulogne, well known through his researches and publications on the medical uses of electricity.

The English journals of October 2d announce the death of Dr. John Hughes Bennett, late Professor of the Institutes of Medicine in the University of Edinburgh. Dr. Bennett was born in 1812, and graduated at Edinburgh in 1837. After several years profitably spent in study in France and Germany, he returned to Edinburgh, where he soon obtained the influential position to which his superior abilities and attainments entitled him. To the profession in this country he is known chiefly through his work on clinical medicine, but in his own country he was recognized as one of the great leaders in the teaching of positive medicine; and, as the *Medical Times and Gazette* says, "his fame and reputation can hardly be sought in printed books or papers, but rather in the minds of the vast number of men whom he has taught and moulded."